Ontario

Forest Resources of Ontario 2006

State of the Forest Report 2006

Forest Information Series

2007-05478/

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Acknowledgements

This is the fourth version of "The Forest Resources of Ontario" that I have compiled since starting with the Forest Management Branch in 1990. Each version has become more detailed, and I have endeavored to make each one more responsive to the questions that cross my desk every day.

The efforts of many people are represented in this report. I would like to thank MNR District and Regional staff, and all forest industry information partners who have provided forest resources information. Special thanks are extended to Garnet Beemer, Rick Recoskie, and Glen Watt for providing access to regional GIS data.

Creating a summary of forest information has become easier with the release of the Forest Information Manual (FIM), which sets standards for how forest information is received. FIM has dramatically improved the consistency, timeliness and accessibility of forest data, which is the underlying basis of this report. Therefore, special thanks go to Hue Higham, Dave Hayhurst and Janet Joyce for their efforts with FIM and their technical support.

And finally, thanks to Colin Templeton for his invaluable assistance in creating this report.

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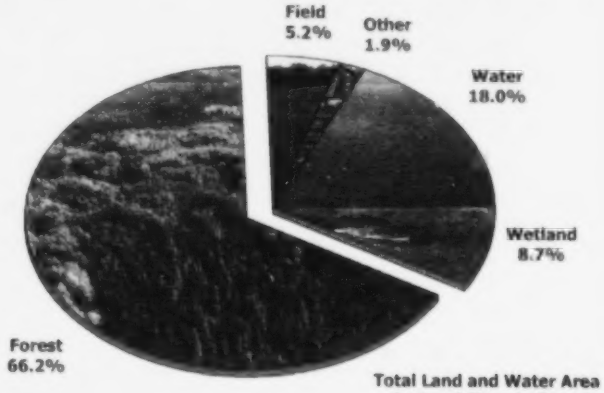
The Forest Resources of Ontario 2006
Summary

Provincial Statistics:

- Ontario is 107.6 million hectares in total area
  - *or* 265.8 million acres
  - *or* 415,260 square miles
- 86.9% of Ontario is Publicly Owned (93.5 million ha)
  - 78.2% is Crown Land (84.1 million ha)
  - 8.7% is within Parks and Protected areas (9.3 million ha)
- 13.1% of Ontario is non-Crown (14.0 million ha)
  - 13.4 million ha patent or private
  - 628 thousand ha First Nations
  - 85 thousand ha Federal



Total Land and Water Area by Land Class in Ontario 107.6 million hectares

- 18.0% of Ontario is water (19.3 million ha), of which 8.7 million ha is the Great Lakes
- 8.7% of Ontario is wetland/marsh/bog (9.4 million ha)
- 5.2% of Ontario is field/agriculture (5.5 million ha)
- 0.6% of Ontario is urban area (596 thousand ha)
- The remaining 1.4% of the "Other" category includes rock, mine tailings, gravel, tundra, mudflats and unknown area

Provincial Administrative Zone Statistics:

- 40.7% of Ontario falls within the Area of the Undertaking (AOU – see definition in glossary) where commercial forestry takes place (43.8 million ha) which is 83.3% forest and 79.4% productive forest
- 45.8% of Ontario falls in the Northern Boreal, which is 68.9% forest and 41.6% productive forest
- 8.2% of Ontario falls within Southern Ontario which is 28.8% forest
- 91% of all people in Ontario live in Southern Ontario

- 42.1% of Ontario falls within the Planning Area, defined as the AOU and the five large parks on its boundary
- 12.4% of the Planning Area is within parks and proposed protected areas

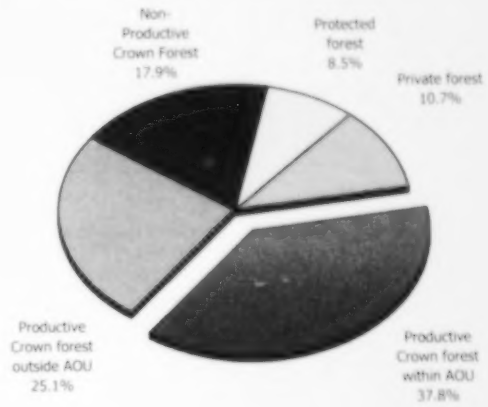
General Provincial Forest Statistics:

- 66.2% of Ontario is forest (71.3 million ha)
- 52.9% is productive forest (56.8 million ha)

- 80.7% of Ontario's forests are Crown forest (57.5 million ha)
- 8.5% of Ontario's forests are within Parks and Protected areas (6.1 million ha)
- 10.7% of Ontario's forests are non-Crown (7.6 million ha)
    - 7.0 million ha patent or private
    - 545 thousand ha First Nations
    - 82 thousand ha Federal

- 30.4% of Ontario is productive forest within the AOU (32.7 million ha)
- 17.5% of Ontario is net operable Crown forest or "production" forest (18.8 million hectares)
- Southern Ontario has only 3.3% of Ontario's forests

Total Proportion of Forest by Ownership/Administrative Zone

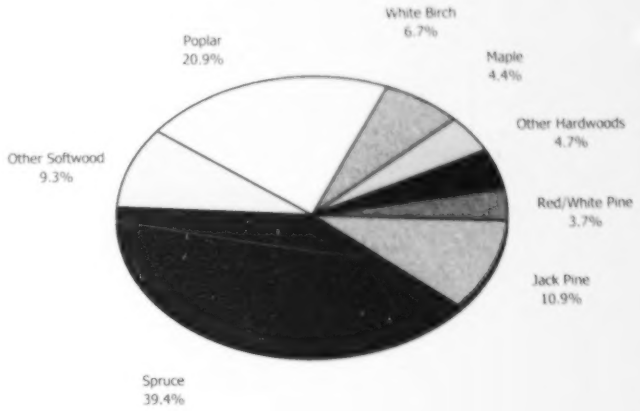

Non-Productive Crown Forest 17.9%
Protected forest 8.5%
Private forest 10.7%
Productive Crown forest outside AOU 25.1%
Productive Crown forest within AOU 37.8%

Forest Growing Stock Statistics:

- Ontario's most common tree is the black spruce (37.4% of total provincial growing stock), followed by Poplar (20.9%), and Jack Pine (10.9%)
- The sugar maple is Ontario's 6th most common tree (4.4% of total provincial growing stock), followed by White Pine (2.9%)
- 55.2% of Ontario's tolerant hardwood growing stock (maple, yellow birch, oak and other hardwoods) is on private land

- There are over 7.2 billion cubic metres of growing stock in Ontario, or 3.1 trillion board feet
- Laid flat on the ground, the province's growing stock would cover all of Ontario with 7mm of wood, or about ¼ inch thick
- Average Net Merchantable Volume (NMV m^3/ha)
    - All Ontario Forest – 75.7 m^3/ha
    - AOU Crown Forest – 86.4 m3/ha
    - Mature AOU Crown Forest – 115.5 m^3/ha

Total Volume Growing Stock by Species Group



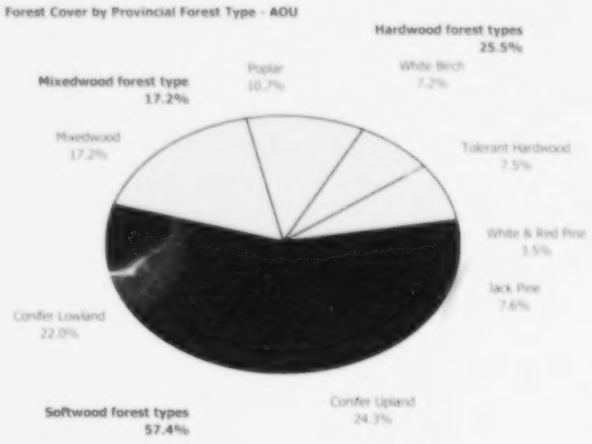
- 65.5% of Ontario's growing stock is in the Boreal forest region
- 65.0% of Ontario's growing stock is in the AOU
- Ontario has approximately 85.3 billion trees
- Ontario's total forest growth equals 62.9 million cubic metres each year, or about 0.9% of total growing stock
- Ontario's total forest depletions (natural and human-caused) between 1990 and 2004 varies from 31 to 73 million cubic metres each year, with an average of 50 million cubic metres annually

Forest Cover Type Statistics:

- 57.4% of the AOU is softwood or coniferous forest types
- 25.5% of the AOU is hardwood or deciduous forest types
- 17.2% of the AOU is mixedwood forest types

- The most common provincial forest types are conifer upland and lowland, which are dominated by spruce, and make up 56.5% of the Boreal forest

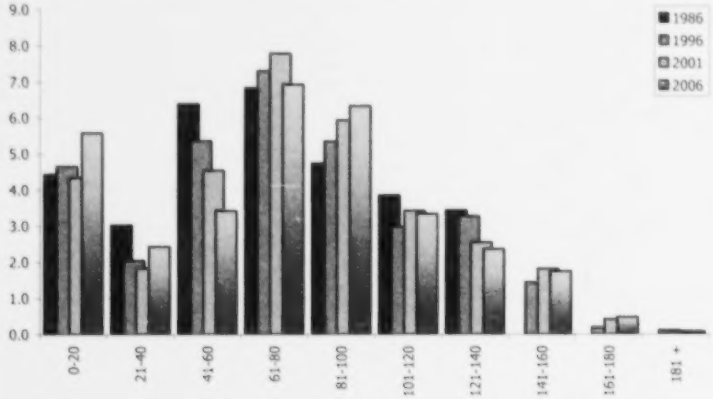
- The Great Lakes St. Lawrence forest most common provincial forest types are Tolerant Hardwoods and Red and White Pine, which make up 35.4% of that forest region

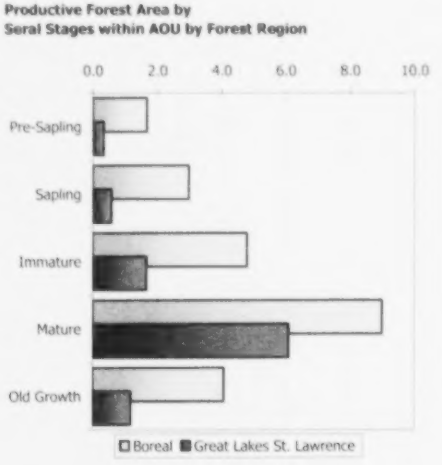


Forest Age Statistics:

- 37.0% of Ontario's Crown Production Forest (within the AOU) is in an immature or younger seral stage or age group (12.1 million ha)
- 46.5% of Ontario's Crown Production Forest (within the AOU) is in a mature seral stage or age group (15.2 million ha)
- 16.5% of Ontario's Crown Production Forest (within the AOU) is in an old growth seral stage or age group (5.4 million ha)

- The highest proportion of old growth is within the Conifer Lowland provincial forest type
- The average age of AOU forest has increased from 73 years old in 1996, to 79 in 2001 and 82 years old in 2006





1 - Introduction

Ontario's landscape is dominated by forests which stretch across the province, from maple and oak forests of the south to the spruce dominated north. This document is the latest installment in a series of forest statistics documents that have been published since the 1920s. The Forest Resources of Ontario 2006 provides a comprehensive overview of Ontario's forests. Statistics describing the area of land and water, forest types, and the distribution of tree species across the province are summarized in the form of tables, charts, and colour maps. Efforts have been made to make this report compatible with the 2001 version for consistency and comparability.

The accuracy of the *Forest Resources of Ontario* continues to improve by making uses of newer, more detailed forest resources inventory (FRI) information, newer satellite imagery, and more accurate mapping information. This report is part of the five-year *State of the Forest Report 2006*. Much of this report, as well as supplementary data, is available on CD, and posted on the OMNR website at www.mnr.gov.on.ca.

In this report, Ontario is subdivided into several different geographical areas based on forest science, ecology, administrative boundaries, and land ownership.

The area totals reported in this version of the *Forest Resources of Ontario* are slightly different than previously published OMNR reports. Newer mapping capabilities have resulted in a slight modification of area measurements. The differences and reasons are further discussed in Chapter 8.

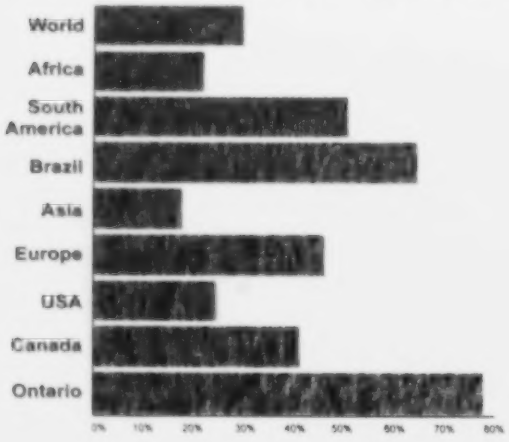
Mississaugi River - North Shore Forest

1.1 – Geographic Context

Canada occupies over 998 million hectares of the earth's surface, including more than 400 million hectares of forests. This represents about 6% of the world's forests. Ontario has over 71 million hectares of forest, which represents about 17% of Canada's forests and 2% of the world's forests. Ontario's total area translates to 10 hectares of land and water for every person in the province and, as part of that, 6.5 hectares of forest.

Figure 1.1.1 demonstrates the proportion of forest vs. total land throughout the world. Ontario has a much higher than average proportion of forest compared to most other places in the world.

Figure 1.1.1 - Proportion of forest compared to total land area



Ontario's forests cover a land area equivalent in size to the landmasses of Germany, Italy and the Netherlands combined, with 57 million hectares of commercially productive forest covering an area roughly equivalent to the area of France. To put this into a North American context, Ontario's forests cover an area equivalent to the combined area of the states of Minnesota, Wisconsin, Michigan, Ohio and West Virginia. *Figure 1.1.2 shows* the relative size of Ontario compared to the United States.

Ontario's landscape is a dominated by forests, lakes, and wetlands. Most citizens of Ontario are very familiar with the southern portions of the province which contain a mixture of small patches of forest, agricultural lands, and urban areas. In reality, that image of Ontario represents only about 7% of the province. This misconception is reinforced by the fact that 91% of the people in Ontario live in the southern portion of the province.

To put Ontario's land base into context, Figure 1.1.3 shows broad land classes and proportions in a histogram. Forests, both non-productive and productive, make up over 66% of the province. This is significantly higher than the Canadian total, which is only 42%. Each of these land classes will be further discussed in Chapter 3.

Figure 1.1.2 - Ontario compared to the United States

Along with land types and ownerships, Ontario can also be partitioned geographically. Depending on the context, there are dozens of ways of viewing pieces of the province. Some common sub-divisions are forest regions, political ridings, census divisions, wildlife management units and forest management units.

There are two ways of dividing Ontario's land base which are used in this document:

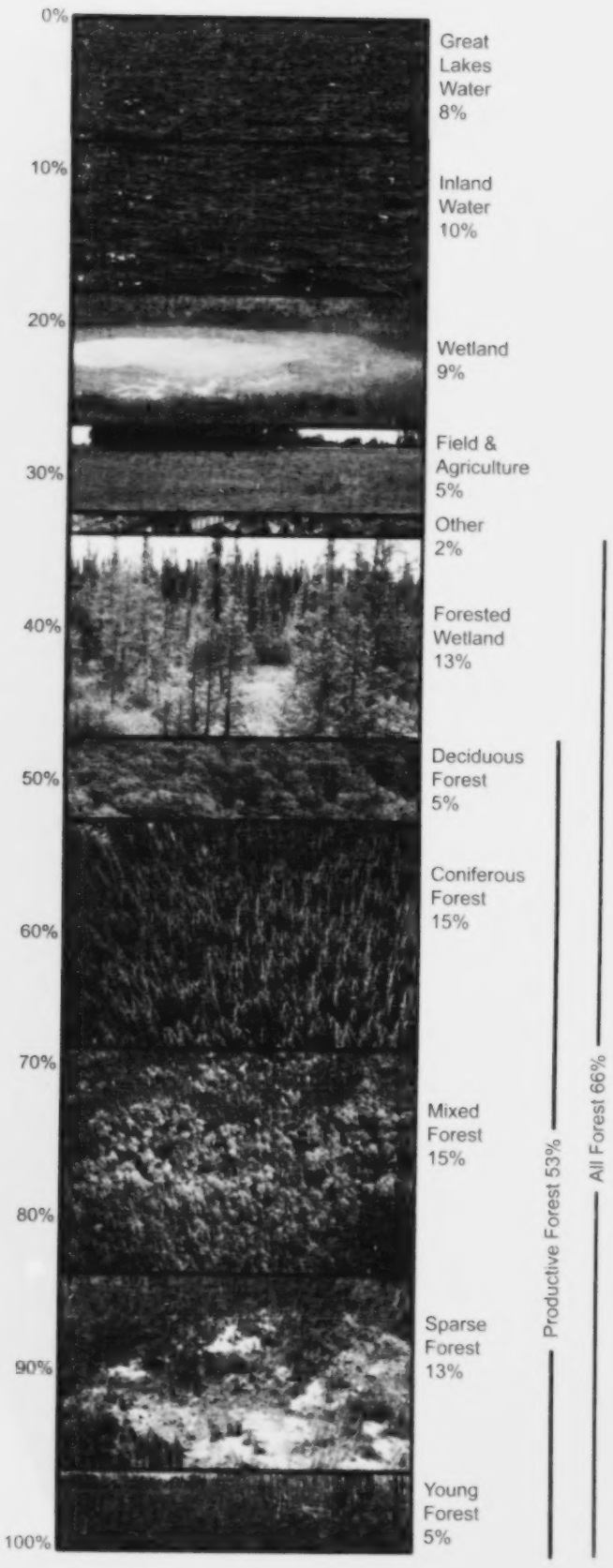
- Forest Regions
- Management Zones

Each section of this report will highlight area summaries based on these common geographic contexts. The area covered by existing FRI inventories is summarized in Chapters 3 and 4, and coincides with the administrative zones discussed later.

Ontario can also be broken into several different ownership classes. For the purposes of this report, three major ownership groups are considered – Crown, protected areas and other owners

In Chapter 4, all classes of ownership are discussed in detail, but most summaries will highlight the three major groups only. Crown or publicly owned land accounts for the majority of Ontario's ownership at 78%. Protected areas, both provincial and national, cover an additional 9%, and privately owned land occupies the remaining 13%. In terms of forest ownerships, Crown forest again leads at 81% of all forest, 9% of forest is within protected areas, and 11% of forest is privately owned.

Figure 1.1.3 - Ontario's Landbase Based on Satellite Classes



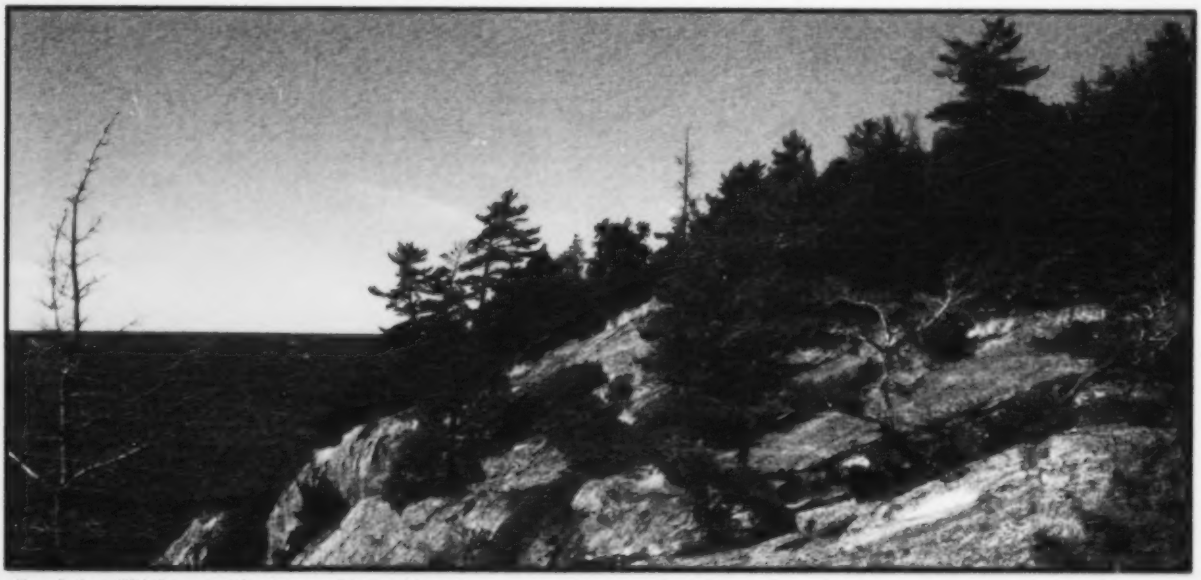
2 – Physical Geography of Ontario

The physical geography of Ontario is a complex topic. Many physical factors affect the growth and distribution of forests in the province. Rather than describing all of the province's physical characteristics, this report highlights those that significantly affect its forests. These factors include geology, soils and climate.

2.1 Geology

Ontario lies on a foundation of bedrock and sedimentary rock that are among the oldest in the world. The Cambrian shield (often referred to as the "Canadian Shield") is dominated by shallow soils and granite bedrock that stretch from the northern end of the Great-Lakes St. Lawrence forests through to the Hudson Bay Lowlands. Over 55% of Ontario sits on this portion of the shield, which is estimated to be over 2.5 billion years old, formed during the "Archean" Era. A younger portion of the shield was formed during the "Proterozoic" Era, which is estimated to be over 680 million years old, found in the Lake Nipigon area and the Sudbury to Kemptville areas, makes up another 11% of Ontario. When combined, these two areas account for 66% of Ontario's area, and contain approximately 86% of Ontario's productive forests.

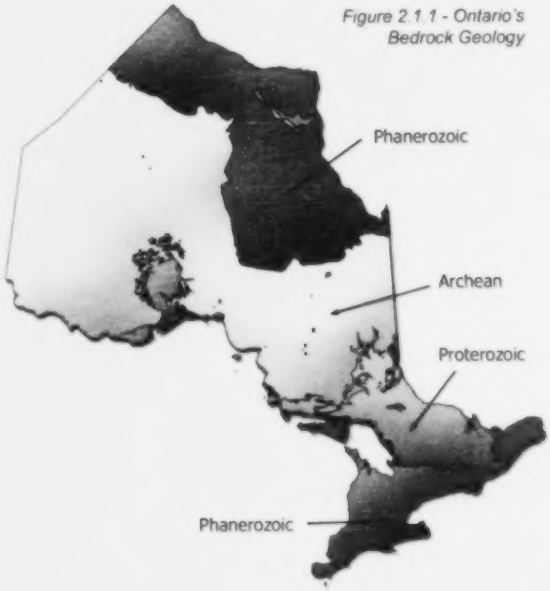
North and south of the Cambrian shield lie areas of carbonate or limestone sedimentary rock formed during the "Phanerozic" Era, specifically the "Silurian" Period over 438 million years ago. Both of these areas contain much less productive forest than the shield, but for very different reasons. The Hudson Bay Lowlands have strong influences of climate and organic soil cover that limit forests



Cambrian Shield - north shore of Lake Huron

to mostly slow growing black spruce. Southern Ontario, in comparison, is a highly productive area that has surrendered its hardwood forests to agriculture and urban settlement.
Ontario's quaternary geology ("quaternary" is a division of time that covers the last two million years through to today) has been heavily influenced by successive periods of glaciation. Approximately 12,000 years ago, the last major glacial advance extended in several major lobes across Ontario (the Laurentide ice sheet). The retreating ice sheet deposited materials of many types

Figure 2.1.1 - Ontario's Bedrock Geology



across their range, and figure 2.1.2 shows a provincial overview of our current surficial geology. The most common material deposited was till, or a mixture of unsorted and unstratified clay, silt, sand gravel and boulders.

Figures 2.1.1 and 2.1.2 are based on the *Ministry of Northern Development and Mines Ontario Geological Survey, 1997, Quaternary geology; Ontario Geological Survey, ERLIS Data Set 14 ISBN 0-7778-9310-X.*

2.2 Soils

Soils are an important factor affecting tree species distribution and growth. Each tree species in Ontario has site specific soil requirements. Surficial geology maps, as in figure 2.1.2, show broad based sources of surficial geology, and are a good indicator of the majority of soils existing within each zone, but variations can occur within those zones. There are three major sources of soils data used in this report:

- The Canadian (Ontario) Land Inventory (OLI), based on 1:250,000 inventories conducted in the early 1970s.
- The Northern Ontario Engineering Terrain Study (NOEGTS), surficial geology & soils data, based on detailed air photo interpretation conducted in the late 1970s.
- The Surficial Geology of Southern Ontario, based on Geological Survey of Canada data.

All studies cover slightly different areas, and were generated at slightly different resolutions. Several maps summarizing these layers are featured in this publication, and more are presented in the map gallery (additional CD material to this publication).

The relationship between forest soils, climate and forest vegetation has long been known to be important to forest management. Starting in 1999, the MNR began photo interpreting broad forest ecosystem classification (FEC) types along with stands of trees in the FRI. The availability of soil depth, texture and moisture classes is a great asset in being able to identify ecosystem types from normal FRI stands. This version of *The Forest Resources of Ontario* uses an aggregation of ecosystem types to develop a more meaningful summary of forest information, based on these new FEC inventories, and other available information.

Jack Pine on shallow soil, rocky site

As an example, black spruce can occur on many soil types, but dominates the clay belt area in the northeastern part of Ontario

Figure 2.1.2 -
Quaternary Geology of Ontario

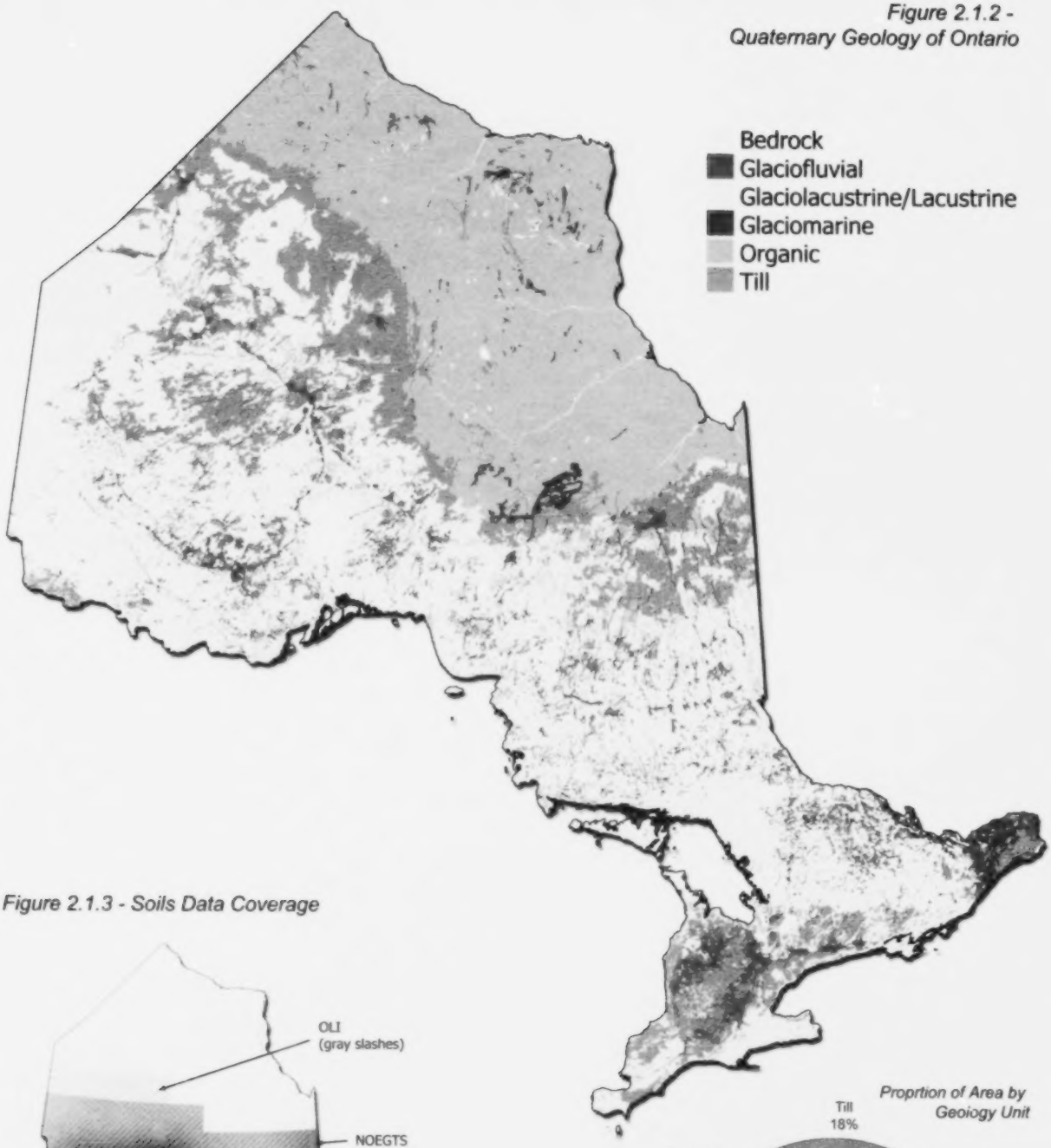
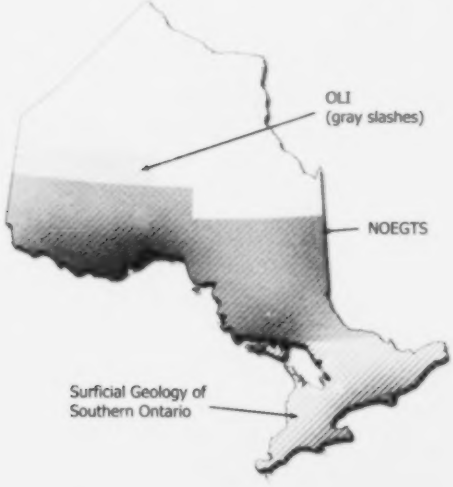


Figure 2.1.3 - Soils Data Coverage



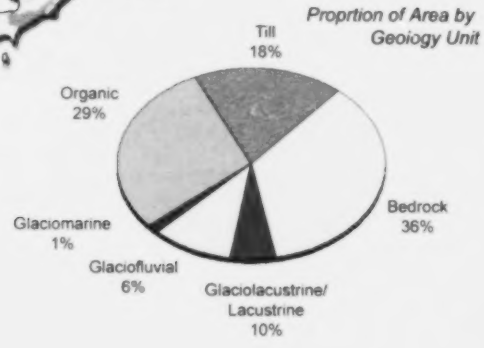
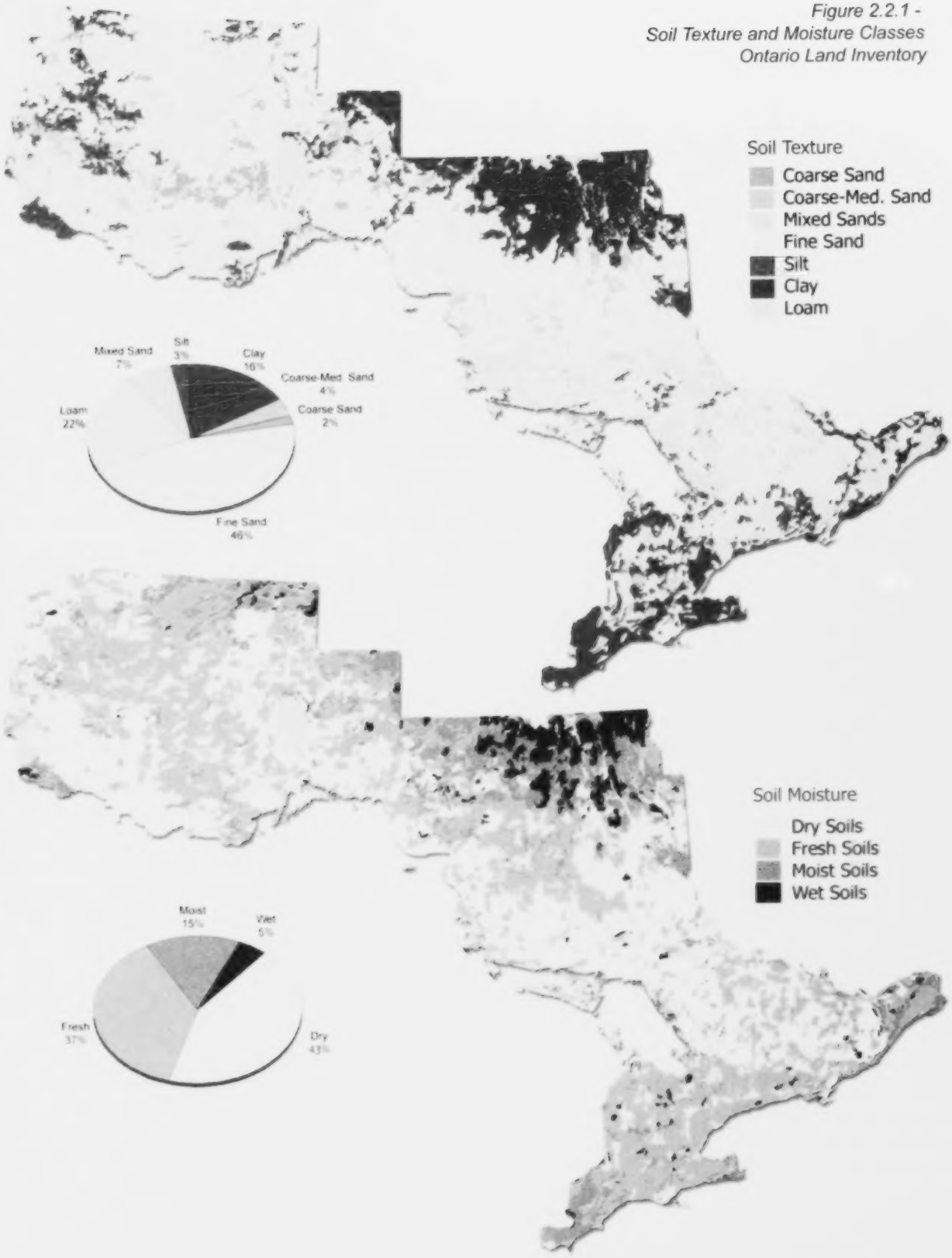


Figure 2.2.1 -
Soil Texture and Moisture Classes
Ontario Land Inventory



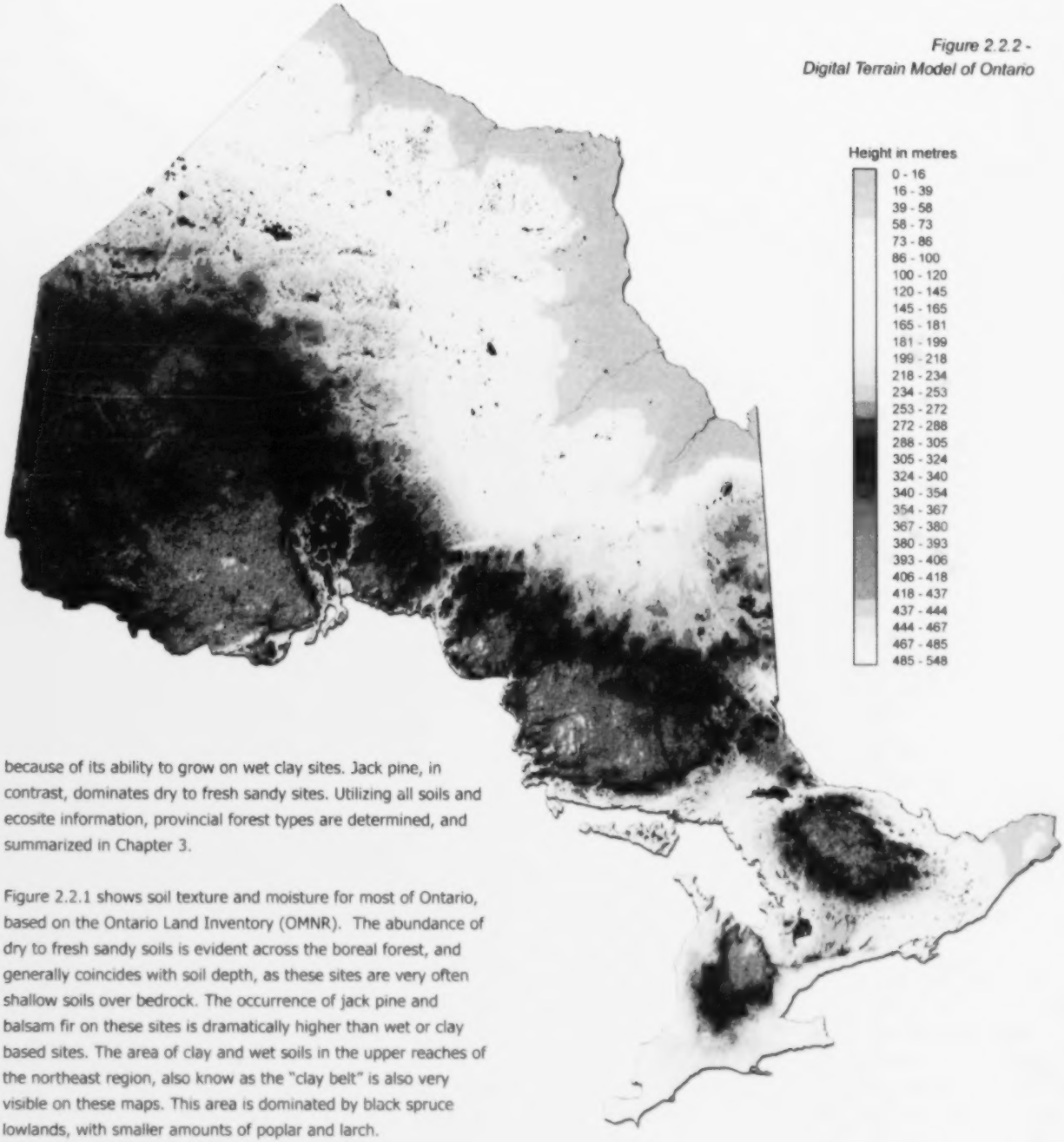


Figure 2.2.2 - Digital Terrain Model of Ontario

because of its ability to grow on wet clay sites. Jack pine, in contrast, dominates dry to fresh sandy sites. Utilizing all soils and ecosite information, provincial forest types are determined, and summarized in Chapter 3.

Figure 2.2.1 shows soil texture and moisture for most of Ontario, based on the Ontario Land Inventory (OMNR). The abundance of dry to fresh sandy soils is evident across the boreal forest, and generally coincides with soil depth, as these sites are very often shallow soils over bedrock. The occurrence of jack pine and balsam fir on these sites is dramatically higher than wet or clay based sites. The area of clay and wet soils in the upper reaches of the northeast region, also know as the "clay belt" is also very visible on these maps. This area is dominated by black spruce lowlands, with smaller amounts of poplar and larch.

2.3 Climate

Climate influences Ontario's forests in a complex pattern. The interaction of climatic factors and soil characteristics has dramatic impact on the tree species found in any given area. Ontario's climate is most affected by cold polar air from Hudson Bay and the prairies, and warmer air from the Gulf of Mexico. The Great Lakes

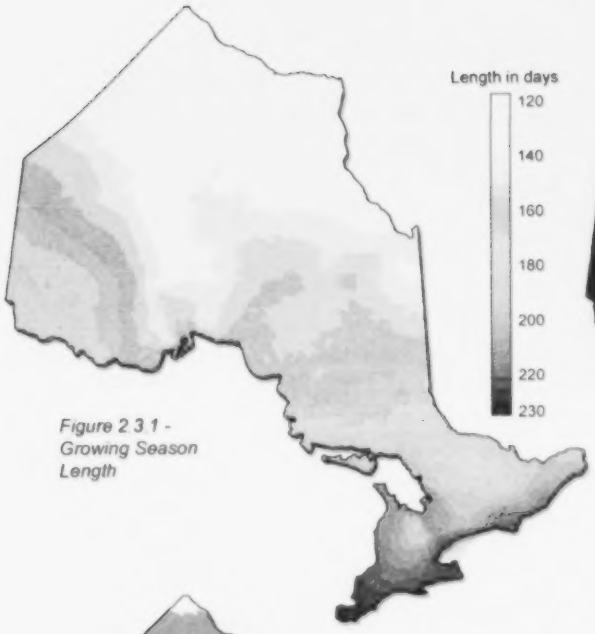


Figure 2.3.1 - Growing Season Length

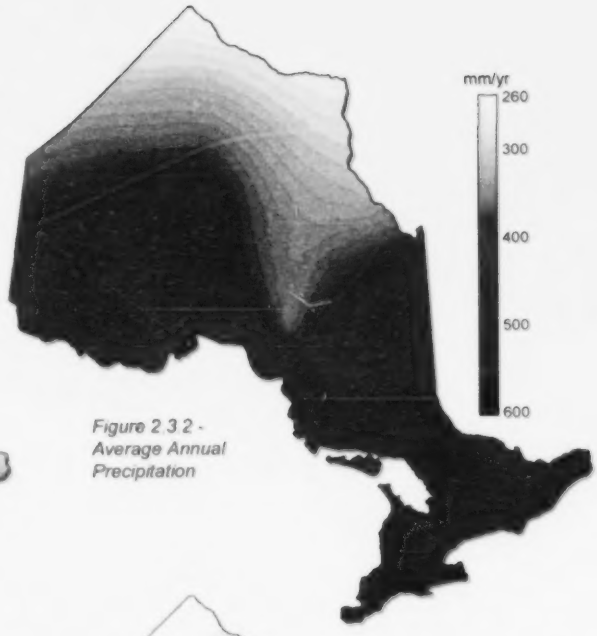


Figure 2.3.2 - Average Annual Precipitation

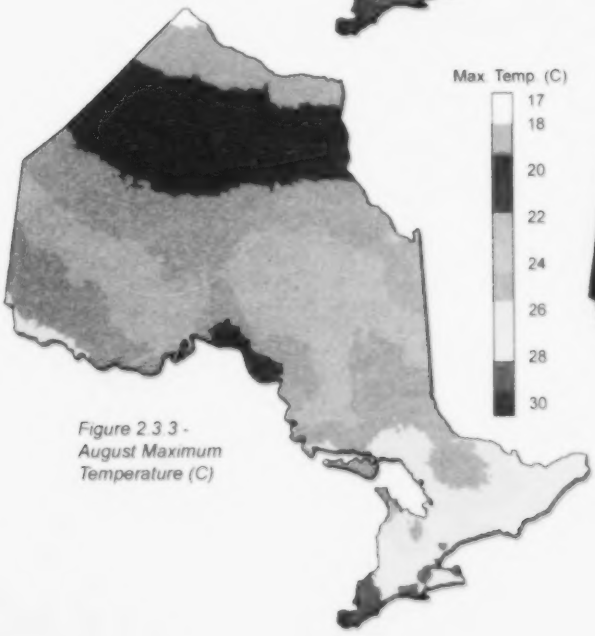


Figure 2.3.3 - August Maximum Temperature (C)

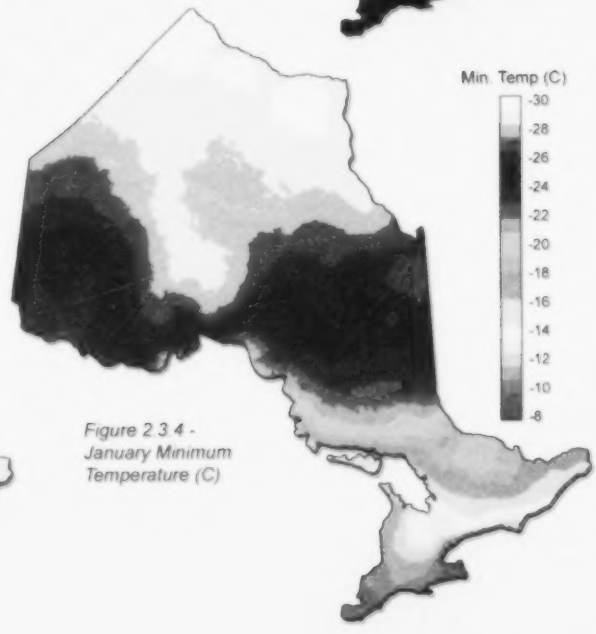


Figure 2.3.4 - January Minimum Temperature (C)

also have a profound influence on Ontario's weather, as can be seen in the climate maps (figures 2.3.1 through 2.3.4).

Growing Season Length

One physical factor affecting Ontario's forests is the length of the growing season. Figure 2.3.1 shows the average annual growing season length in days over the past 20 years. The transition in growing days from north to south, which very nearly doubles as it reaches southwestern Ontario, highlights the wide range of latitude that Ontario covers.

Precipitation

Annual precipitation is another major physical factor affecting Ontario's forests. Figure 2.3.2 shows the average annual precipitation in Ontario in millimetres per year over the past 20 years.

Seasonal drought also affects distribution of some tree species. Species such as jack pine can thrive in the drier regions of northwestern Ontario, whereas maple is limited to more southern, wetter regions. The sugar maple distribution map in Section 5.2 shows the link to precipitation and temperature on the eastern shore of Lake Superior, with maple growing less abundantly inland, away from the moderating influence of the lake.

Temperature

The figures on the facing page demonstrate August maximum temperature over the last 20 years (Figure 2.3.3) and January minimum temperature over the same period (Figure 2.3.4).

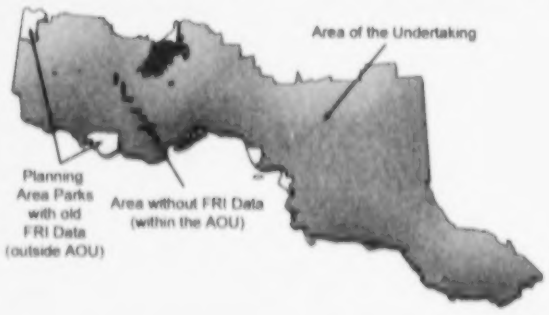
Minimum and maximum temperatures can dramatically influence tree species distribution. Many deciduous species found in the Great Lakes-St. Lawrence forests are sensitive to very cold winter temperatures, and thus have limited occurrence in the north. Average summer temperatures can also influence tree species distribution, by affecting the survival of young trees.

Black spruce on wet site (sphagnum moss)

3 – Area by Land Class

The Forest Resources of Ontario uses Forest Resources Inventory (FRI) to summarize provincial statistics on forest cover as well as land and water classes. Each report is based on a slightly different land base due to the availability of inventories. The 1930 version of this report covered roughly 30 million hectares (28% of the province), the 1963 report covered over 70 million hectares (66% of the province), and the 1986 and 1996 reports covered 61 million hectares (57% of the province). The FRI utilized in this report is generally limited to the Area of the Undertaking (AOU), which covers 43.8 million hectares of Ontario, and represents the area where the majority of commercial forest management is practiced.

Figure 3.0.1 - Forest Resources Inventory Coverage



Traditionally, a summary of all inventoried area is provided within each Forest Resources of Ontario report, generally over 60 million hectares. However, since the inventories of southern Ontario and the extreme north are now more than 25 years old, they are not included in this report. Most of the AOU is summarized in this chapter, but there are small gaps including: pockets of private land

Closeup of fungi on the forest floor

in the northwest corner of the AOU; Lake Nipigon and its islands, and Wabikimi Provincial Park. As well, the large parks outside the AOU that constitute the planning area are also missing (part of Wabikimi, Woodland Caribou, Quetico, Lake Superior Park, and Pukaskwa). To make an accurate representation, the missing pieces will be summarized using satellite data, and identified as such. Both the Planning Area and AOU are also summarized in Chapter 4.

The Forest Resources of Ontario 2001 was the first in the report series to utilize satellite data. This change allowed for a complete breakdown of all the land and water in the province, based on satellite data. This 2006 version also includes satellite data, which has been significantly updated since 2001. The satellite data used in the 2001 report was compiled by the MNR during the mid-1990s, based on Landsat 5 imagery, and had been updated to 1998. The 2006 report includes new imagery for almost the entire province, compiled between 1999 and 2002, and is based on Landsat 7 imagery. The difference between the two imagery sets is documented in Chapter 8. As well, a discussion of the relationship between FRI and satellite data, and further discussion of the satellite classes and documentation is included in Chapter 8.

3.1 – Satellite Land Classes

The 27-class data set has been summarized into the following 17 groupings:

Non-forested Land/Water:

- **Water** – all water bodies other than marshes and wetlands.
- **Great Lakes water** – all water contained in the Great Lakes and St. Lawrence Seaway, as means to track this water separately from inland water bodies.
- **Wetlands** – all wetland areas including coastal mudflats, marshes, open fens and open bogs.
- **Rock** – areas of sand & gravel, mine tailings, quarries and rock outcrops.
- **UCL** – Unclassified Land – settlement and developed land.
- **Field / DAL** – areas of field, pasture, open grassland and alvar or developed agricultural land (crops).
- **Other** – includes tundra heath, mudflats and other satellite class.
- **Unknown** - areas of cloud cover or shadow where no class is available.

Non-productive forest:

- **Swamps** – all wetlands containing tree cover, including deciduous swamp and conifer swamps.
- **Treed bogs and fens** – all wetlands containing tree cover, including treed bogs and treed fens.

Productive Forest:

- **Dense deciduous forest** - continuous forest canopy composed of at least 80 % of deciduous (hardwood) species such as maple or aspen.
- **Dense coniferous forest** - continuous forest canopy composed of at least 80 % of coniferous (softwood) species such as spruce or pine.
- **Mixed forest** – continuous forest canopy composed of coniferous and deciduous species.
- **Sparse forest** - patchy forest canopy (less than 30% canopy closure).
- **Regenerating forest – recent cutovers** - forest clearcuts estimated at less than 10 years of age.
- **Regenerating forest – recent forest fires** - forest estimated at less than 10 years of age.
- **Regenerating forest** – forest clear-cuts and burns estimated at more than 10 years of age, and generally less than 25 years old.

These satellite classes are slightly different than the classes used in 2001, due to the amalgamation of the conifer and hardwood mixedwood classes, and the conifer and hardwood sparse classes.

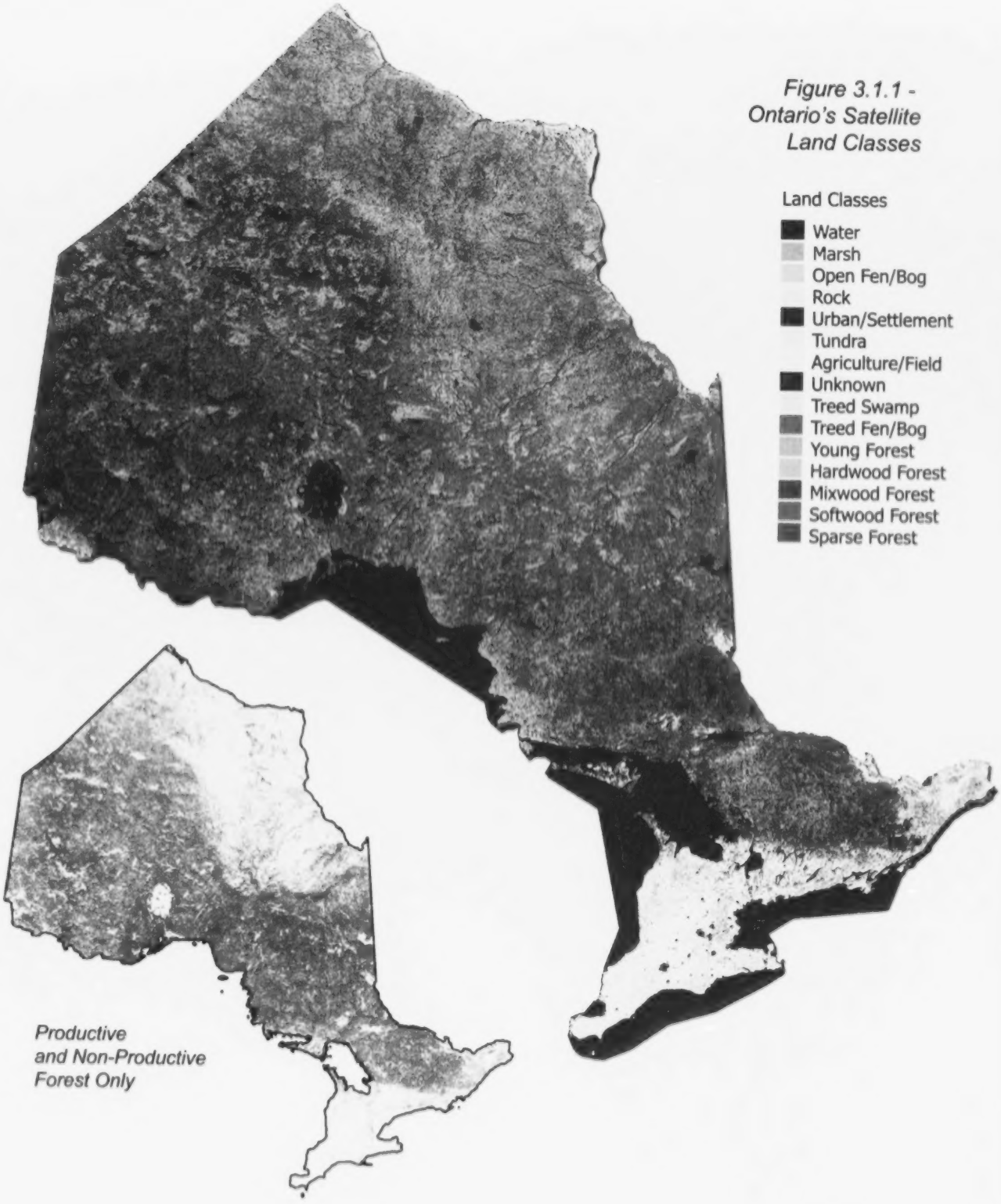
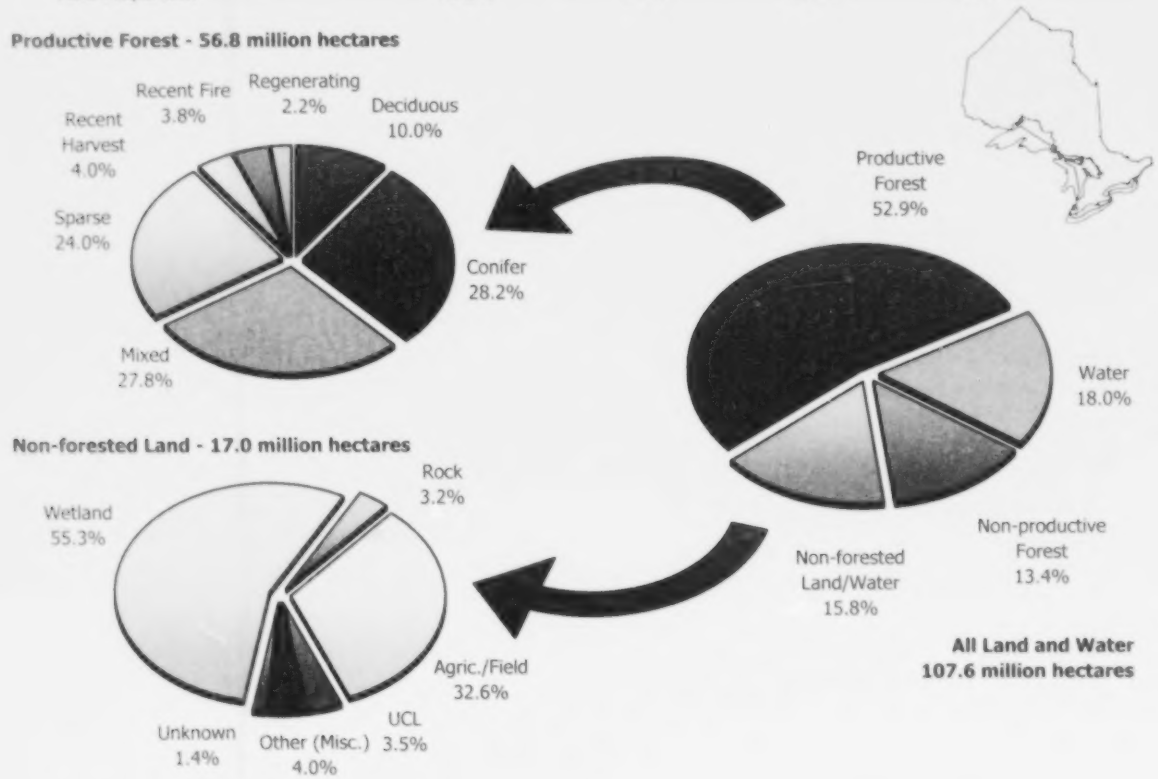


Figure 3.1.1 - Ontario's Satellite Land Classes

3.1.1 - All Land and Water - Ontario Totals - Satellite Based

Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	*Proportion*
Non-forested Land/Water					
Water (Great Lakes)	8,517.3	169.8	0.0	8,687.1	8.1%
Water	9,118.0	1,559.2	0.0	10,677.2	9.9%
Wetland	8,175.7	1,065.6	130.9	9,372.2	8.7%
Rock	258.6	105.0	183.3	546.8	0.5%
Field/Agriculture	27.5	5.6	5,501.3	5,534.4	5.1%
UCL	56.5	2.8	536.7	596.0	0.6%
Other (Misc.)	335.2	287.0	48.9	671.0	0.6%
Other (Unknown/Cloud)	144.8	50.3	44.7	239.8	0.2%
Subtotal:	26,633.6	3,245.4	6,445.7	36,324.6	33.8%
Non-productive Forest					
Swamp	1.2	1.8	118.4	121.4	0.1%
Treed Bog & Fen	12,757.0	1,114.3	391.8	14,263.1	13.3%
Subtotal:	12,758.2	1,116.1	510.2	14,384.5	13.4%
Productive Forest					
Dense Deciduous	3,235.0	524.9	1,912.1	5,672.0	5.3%
Dense Conifer	13,513.7	1,426.7	1,069.8	16,010.1	14.9%
Mixed Forest	11,617.5	1,534.6	2,657.1	15,809.2	14.7%
Sparse Forest	11,350.6	1,109.9	1,206.3	13,666.7	12.7%
Disturbance - Harvest	2,042.1	32.9	189.9	2,264.9	2.1%
Disturbance - Fire	1,893.8	236.7	42.2	2,172.7	2.0%
Regenerating Forest	1,097.4	99.1	52.9	1,249.4	1.2%
Subtotal:	44,750.0	4,964.8	7,130.2	56,845.0	52.9%
All Forest:	57,508.2	6,081.0	7,640.4	71,229.5	66.2%
Forest Proportion:	80.7%	8.5%	10.7%	100.0%	
Grand Total:	84,141.7	9,326.3	14,086.1	107,554.2	100.0%
Total Proportion:	78.2%	8.7%	13.1%	100.0%	

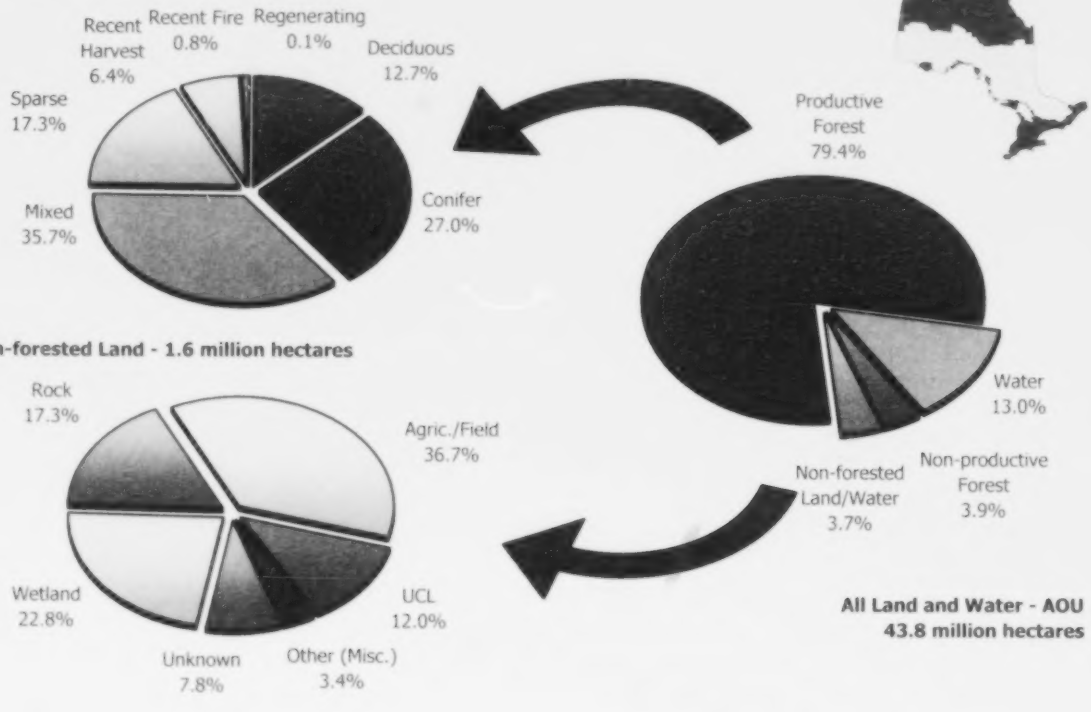


3.1.1 - All Land Classification - Area of the Undertaking (AOU) Totals - Satellite Based

Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	Proportion
Non-forested Land/Water					
Water	4,833.1	883.9	0.0	5,716.9	13.0%
Wetland	271.0	60.7	34.0	365.7	0.8%
Rock	103.9	58.3	115.1	277.3	0.6%
Field/Agriculture	16.1	0.8	571.1	587.9	1.3%
UCL	41.9	2.0	148.2	192.1	0.4%
Other (Misc.)	39.0	6.2	9.1	54.4	0.1%
Other (Unknown/Cloud)	72.7	25.3	27.5	125.5	0.3%
Subtotal:	5,377.7	1,037.2	905.0	7,319.8	16.7%
Non-productive Forest					
Swamp	0.0	0.3	19.5	19.9	0.0%
Treed Bog & Fen	1,337.2	167.3	170.8	1,675.2	3.8%
Subtotal:	1,337.2	167.6	190.3	1,695.1	3.9%
Productive Forest					
Dense Deciduous	2,942.7	295.6	1,174.8	4,413.1	10.1%
Dense Conifer	7,702.8	949.4	740.1	9,392.3	21.4%
Mixed Forest	9,463.0	1,011.3	1,940.7	12,415.0	28.3%
Sparse Forest	4,517.6	587.7	913.5	6,018.7	13.7%
Disturbance - Harvest	2,040.8	32.1	162.5	2,235.5	5.1%
Disturbance - Fire	207.1	74.0	4.7	285.9	0.7%
Regenerating Forest	23.2	5.6	4.2	33.0	0.1%
Subtotal:	26,897.3	2,955.7	4,940.5	34,793.5	79.4%
All Forest:	28,234.5	3,123.3	5,130.8	36,488.6	83.3%
Forest Proportion:	77.4%	8.6%	14.1%	100.0%	
Grand Total:	33,612.2	4,160.5	6,035.8	43,808.4	100.0%
Total Proportion:	76.7%	9.5%	13.8%	100.0%	

Productive Forest - 34.8 million hectares



Non-forested Land - 1.6 million hectares

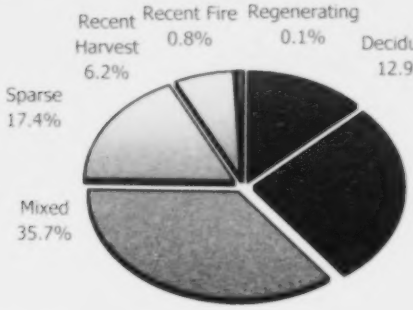
All Land and Water - AOU 43.8 million hectares

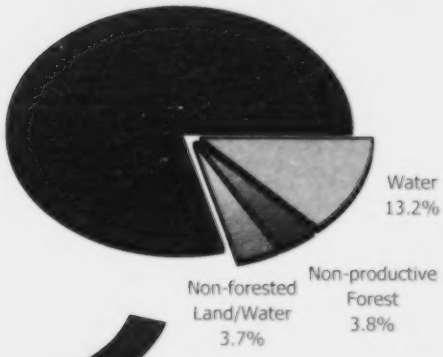
3.1.1 - All Land Classification - Planning Area Totals - Satellite Based

Area in thousands of hectares

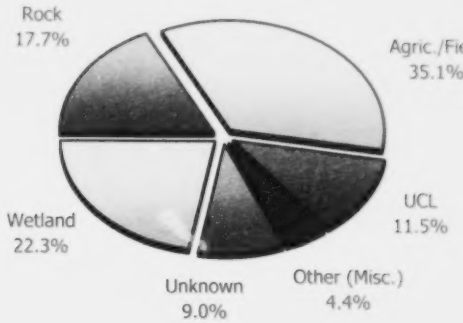
Land Class	Crown	Protected Areas	Other	Total	*Proportion*
Non-forested Land/Water					
Water	4,837.3	1,125.1	0.0	5,962.4	13.2%
Wetland	271.0	69.4	34.2	374.6	0.8%
Rock	105.9	76.4	115.5	297.9	0.7%
Field/Agriculture	16.5	0.8	571.8	589.1	1.3%
UCL	42.3	2.3	148.3	192.9	0.4%
Other (Misc.)	39.2	25.7	9.1	74.0	0.2%
Other (Unknown/Cloud)	73.9	49.7	27.6	151.2	0.3%
Subtotal:	5,386.2	1,349.5	906.6	7,642.2	16.9%
Non-productive Forest					
Swamp	0.1	0.4	19.5	20.0	0.0%
Treed Bog & Fen	1,337.2	215.1	171.4	1,723.7	3.8%
Subtotal:	1,337.3	215.5	190.9	1,743.7	3.8%
Productive Forest					
Dense Deciduous	2,943.4	492.3	1,180.6	4,616.4	10.2%
Dense Conifer	7,704.0	1,214.6	740.8	9,659.4	21.3%
Mixed Forest	9,466.3	1,390.5	1,946.5	12,803.3	28.3%
Sparse Forest	4,519.3	815.0	916.6	6,250.9	13.8%
Disturbance - Harvest	2,040.8	32.8	162.5	2,236.2	4.9%
Disturbance - Fire	207.2	86.3	4.7	298.1	0.7%
Regenerating Forest	23.2	14.3	4.2	41.7	0.1%
Subtotal:	26,904.2	4,045.8	4,956.0	35,906.1	79.3%
All Forest:	28,241.6	4,261.3	5,146.9	37,649.8	83.1%
Forest Proportion:	75.0%	11.3%	13.7%	100.0%	
Grand Total:	33,627.7	5,610.8	6,053.4	45,292.0	100.0%
Total Proportion:	74.2%	12.4%	13.4%	100.0%	

Productive Forest - 35.9 million hectares





Non-forested Land - 1.7 million hectares



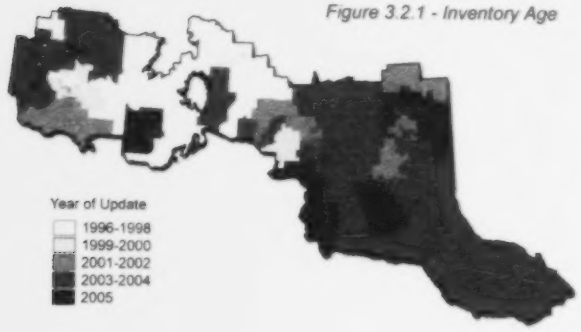
All Land and Water - Planning Area 45.3 million hectares

3.2 – Forest Inventory Classes

The Forest Resources Inventory (FRI) is a detailed forest map compiled on an ongoing basis by the OMNR. Stands of trees and other non-forested areas are classified through interpretation of aerial photographs combined with field checks. Ontario has been inventorying its forests since 1922. With the advent of geographic information systems (GIS) in the 1980s and 90s, digital inventories provide detailed spatial information about Ontario's forests.

The FRI classifies a land base into broad physical components such as productive forest, non-productive forest, non-forested land and water. Each component is further classified by its ownership, land use type and ecological characteristics. It is important to note that the way satellite and FRI classify forests is different, and that the numbers in this section may differ slightly from each other. The total area of forest however, is remarkably similar considering the different sources of data. A comparison between a FRI based stand and a satellite interpretation is documented in Chapter 8. The most significant difference between these systems is what actually constitutes forest. The FRI has a 4-hectare minimum stand size, although smaller groups of trees do occur in the FRI, and the satellite data used in this document will allow groupings of trees to be classed as forest smaller than one-sixteenth of a hectare (25 metres). This results in more forest area in some portions of the province where small fragmented pieces of forest exist, such as southern Ontario. Chapter 7 discusses patch size of forest within southern Ontario as an example.

Figure 3.2.1 - Inventory Age



The average age of FRI data within the AOU is approximately 4 to 8 years old, with most inventories now being updated and submitted every FMP cycle. The inventory age relates to the latest update year, as the photography year of some units is more than 10 years ago. All inventories in this report have been updated for harvest, fire and insect damage.

Historically, *The Forest Resources of Ontario* summarizes forest types by working groups, or dominant tree species. The 2006 version includes traditional working group summaries in Chapter 6, and also includes provincial forest types, first summarized in 2001. Provincial forest types are based on ecological processes, and utilize forest / landscape units described in the regional forest ecosystem classification (FEC) guides. This forest ecosystem aggregation uses more than just the dominant tree species, by incorporating information on forest understory vegetation, soil, and associated tree species. There are currently 3 provincial FEC sets (one for each region) that aggregate into the standard regional forest units and the wildlife habitat units used in forest management planning. The provincial forest types used in this document are an aggregation of these classification sets, applied to the current set of forest resources inventories (FRI).

All summaries *except* those involving provincial forest types include satellite data. Totals for productive forest area within the AOU are 34.8 million hectares, and PFT summaries total 32.7 million hectares.

The 8 provincial forest types are:

- **White and Red Pine** – all red and white pine mixedwood stands
- **Jack Pine** – predominantly jack pine stands
- **Upland Conifers** – predominantly mixed spruce, jack pine and fir stands on upland sites
- **Lowland Conifers** – predominantly black spruce stands on low, poorly drained sites
- **Mixedwood** – mixed stands made up mostly of spruce, jack pine, fir, poplar and white birch
- **Poplar** – predominantly poplar stands
- **White Birch** – predominantly white birch stands
- **Tolerant Hardwoods** – predominantly hardwoods such as maple and oak, found mostly in the Great Lakes - St. Lawrence forest region

The ownership and land use classes used in this version of the report are the same as 2001 version:

- **Crown Production:** This represents Crown forest that is generally managed for harvest. Land withdrawals normally associated with areas of concern (AOCs), areas of scientific and natural interest (ANSIs) and other planning concerns are lumped in with this category in most cases. Some inventories in the current data set have enhanced classification systems, with these areas included in protection forest.

- **Crown Protection:** Areas of Crown productive forest land on which forest management activities cannot normally be practised without incurring deleterious environmental effects

because of obvious physical limitations such as steep slopes and shallow soils over bedrock. Areas of low productivity identified as site class 4 (SC4) in the FRI, are also classified as protection forest.

- **Protected Areas:** Areas of forest/land within all national parks, provincial parks, and conservation reserves, both recommended and regulated.

- **Other:** Areas of forest within Federal or private ownership.

Along with age class data, this section also includes age summaries by seral stage, or development stage of ecological succession. The five stages have different onset ages or age groupings for each provincial forest type. For instance, poplar is a much less long-lived species than black spruce, and old growth poplar is defined as 95 years of age, rather than 135 years for lowland black spruce. The five stages are:

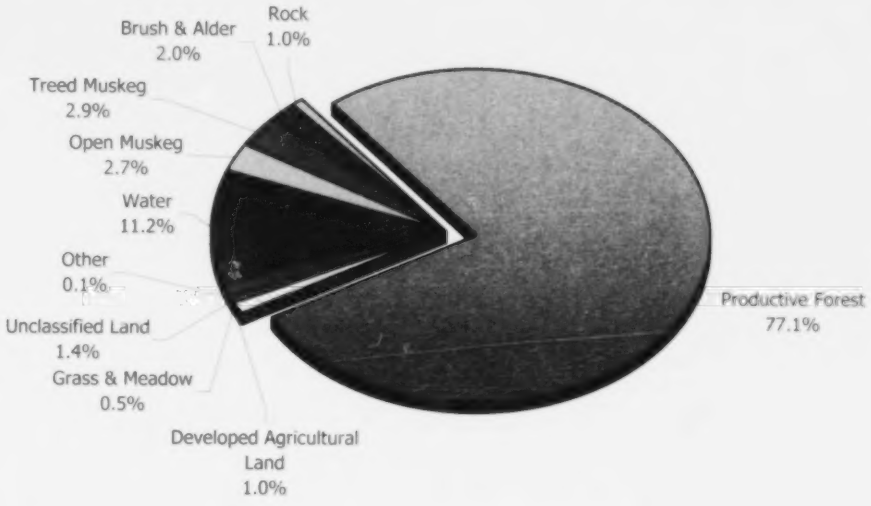
- Pre-Sapling
- Sapling
- Immature
- Mature
- Late Successional (Old Growth)

3.2.1 - All Land Classification Within the AOU - Forest Resources Inventory Based

Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	Proportion
Non-forested Land/Water					
Developed Agricultural Land	1.9	0.2	430.7	432.9	1.0%
Grass & Meadow	6.4	0.7	220.7	227.8	0.5%
Unclassified Land	240.1	15.9	343.0	599.0	1.4%
Other	20.4	7.2	1.7	29.3	0.1%
Water	4,115.4	642.1	0.0	4,757.5	10.9%
Subtotal:	4,384.2	666.1	996.1	6,046.4	13.8%
Non-productive Forest					
Open Muskeg	857.2	100.5	195.8	1,153.5	2.6%
Treed Muskeg	1,039.6	125.7	72.3	1,237.6	2.8%
Brush & Alder	645.3	56.8	163.2	865.3	2.0%
Rock	225.9	95.6	84.1	405.6	0.9%
Subtotal:	2,768.0	378.6	515.4	3,661.9	8.4%
Forested Land					
Productive Forest	26,229.9	2,323.0	4,128.4	32,681.3	74.6%
Total - All Inventoried Area:	33,382.0	3,367.7	5,639.9	42,389.6	96.8%
Total - Missing Area:	230.1	792.8	395.9	1,418.8	3.2%
Total - All Land and Water:	33,612.2	4,160.5	6,035.8	43,808.4	100.0%
Proportion of Missing Area:	0.7%	19.1%	6.6%	3.2%	

Area by Inventory Land Class within the AOU



Comparison of FRI vs. Satellite Categories for AOU

Land Class	FRI	Satellite	Difference
Water	4,757.5	5,716.9	-16.8%
DAL/Field/Grass	660.7	587.9	12.4%
Unclassified Land	599.0	274.0	118.6%
Treed Muskeg	1,237.6	1,630.3	-24.1%
Productive Forest	32,681.3	34,793.5	-6.1%

Area within comparison is that with full FRI data coverage only.

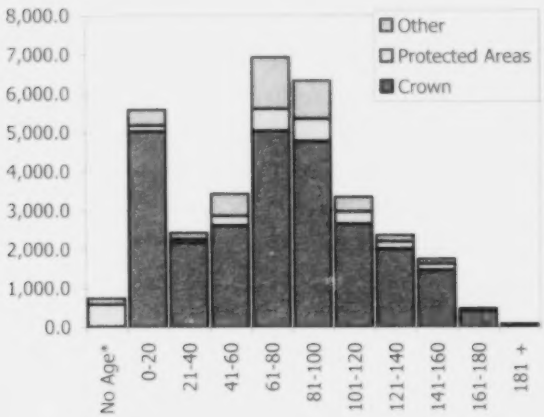
3.2.2 - Forest Age Classes Within the AOU

Productive Forest Area by 20 Year Age Class

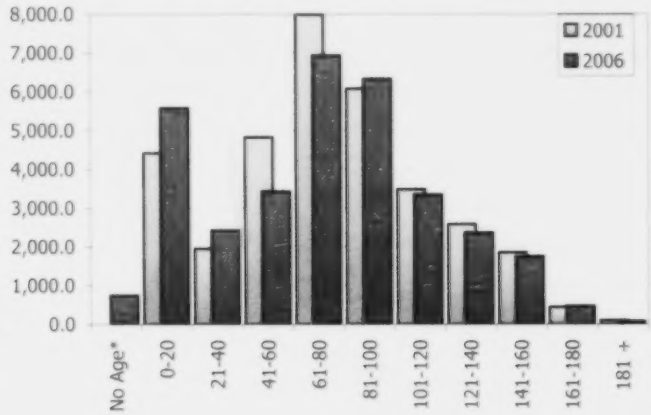
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	4,989.1	33.6	5,022.8	153.9	400.0	5,576.6	16.7%
21-40	2,127.3	42.2	2,169.6	93.6	166.7	2,430.0	7.3%
41-60	2,519.6	90.7	2,610.3	249.0	565.7	3,425.0	10.2%
61-80	4,796.3	242.0	5,038.4	565.2	1,322.4	6,926.0	20.7%
81-100	4,543.4	234.3	4,777.6	570.9	977.1	6,325.6	18.9%
101-120	2,477.1	180.0	2,657.1	300.9	384.0	3,341.9	10.0%
121-140	1,744.6	265.8	2,010.4	180.1	169.7	2,360.2	7.1%
141-160	1,292.0	172.8	1,464.8	160.3	121.6	1,746.6	5.2%
161-180	361.3	60.6	422.0	32.8	17.5	472.3	1.4%
181 +	54.0	3.0	57.0	16.3	3.8	77.1	0.2%
Total:	24,904.8	1,325.1	26,229.9	2,323.0	4,128.4	32,681.3	97.8%
*No Age/Class**	15.5	0.0	15.5	570.1	158.3	743.8	2.2%
Grand Total:	24,920.3	1,325.1	26,245.3	2,893.1	4,286.7	33,425.1	100.0%

Forest Area by 20 Year Age Class and Ownership within the AOU

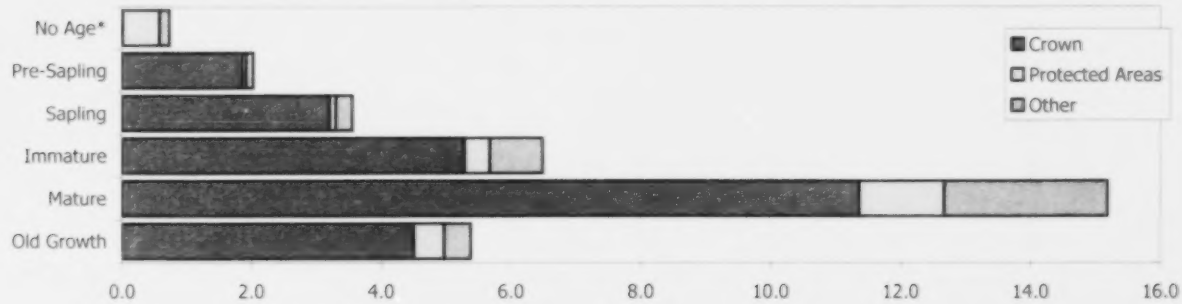


Forest Area by 20 Year Age Class within the AOU - 2001 vs. 2006



Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
No Age/Class*	15.5	0.0	15.5	570.1	158.3	743.8	2.2%
Pre-Sapling	1,846.0	14.5	1,860.5	59.2	115.7	2,035.4	6.1%
Sapling	3,185.4	19.9	3,205.3	97.1	260.1	3,562.4	10.7%
Immature	5,138.8	152.5	5,291.3	384.7	821.6	6,497.6	19.4%
Mature	10,646.3	721.2	11,367.5	1,310.6	2,518.0	15,196.1	45.5%
Old Growth	4,088.4	417.0	4,505.3	471.3	413.0	5,389.7	16.1%
Total:	24,920.3	1,325.1	26,245.3	2,893.1	4,286.7	33,425.1	100.0%



** No Age/Class denotes general forest cover derived from satellite, all other data FRI based*

3.2.3 - Provincial Forest Types by Age Class within Inventoried AOU

Productive Forest Area by 20 Year Age Class - All Ownerships

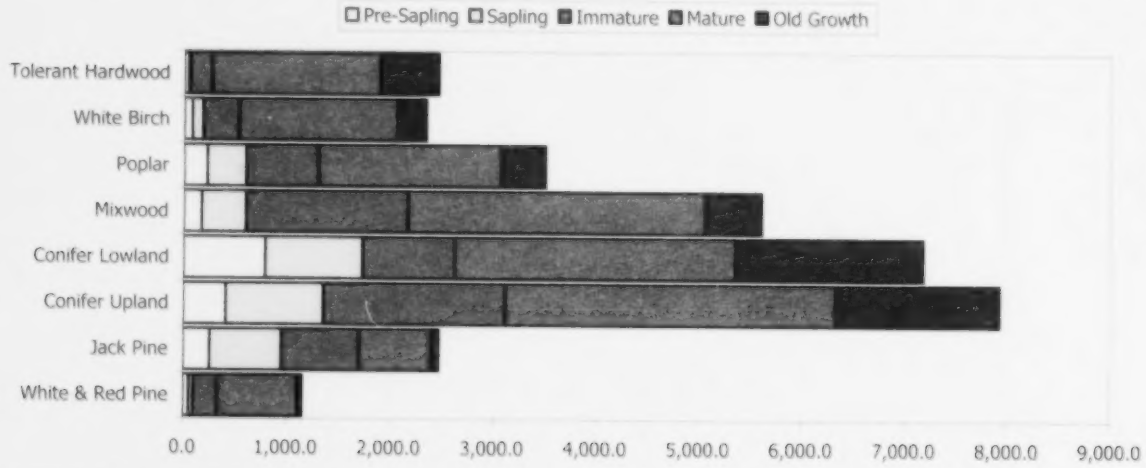
Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	96.6	954.4	1,355.6	1,538.3	606.0	755.6	214.7	55.5	5,576.6
21-40	53.6	443.0	600.9	279.6	661.2	284.5	77.4	29.8	2,430.0
41-60	77.8	240.1	856.5	359.7	910.0	428.9	439.2	112.7	3,425.0
61-80	170.3	422.3	1,649.7	688.8	1,561.3	1,040.9	895.7	496.9	6,926.0
81-100	316.7	308.4	1,611.4	880.0	1,153.6	678.8	522.4	854.3	6,325.6
101-120	277.9	71.1	822.4	873.8	463.1	254.6	153.7	425.3	3,341.9
121-140	104.1	34.2	513.6	1,191.8	161.6	52.6	35.3	267.0	2,360.2
141-160	36.8	7.8	367.5	1,098.3	79.6	8.3	7.8	140.5	1,746.6
161-180	15.5	0.6	117.9	262.7	7.0	0.3	1.4	67.0	472.3
181 +	8.9	0.1	35.9	11.3	3.2	0.1	0.3	17.3	77.1
Total:	1,158.3	2,482.0	7,931.3	7,184.4	5,606.6	3,504.6	2,347.7	2,466.4	32,681.3

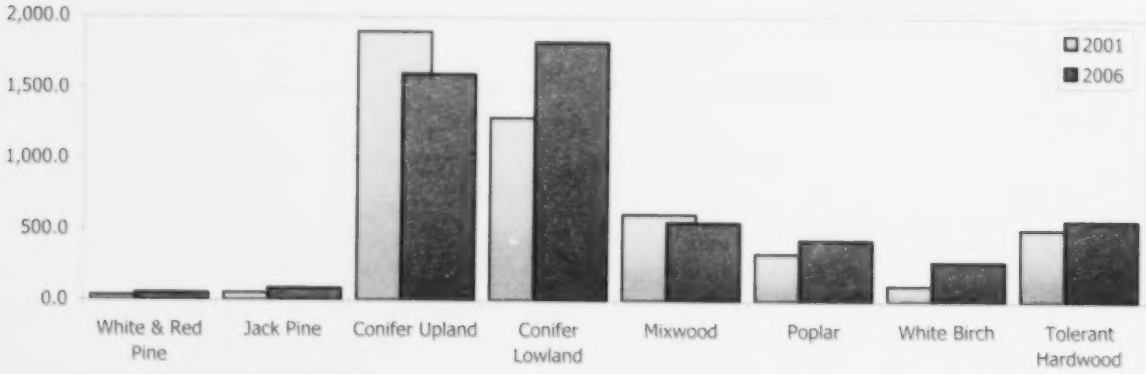
Productive Forest Area by Seral Stage - All Ownerships

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	56.0	257.1	411.0	792.7	173.4	225.7	79.2	40.3	2,035.4
Sapling	40.6	697.2	944.6	942.5	432.6	379.2	106.0	19.7	3,562.4
Immature	244.1	756.4	1,769.0	897.9	1,571.2	698.4	349.7	210.9	6,497.6
Mature	767.6	687.5	3,209.4	2,726.6	2,877.0	1,770.2	1,533.0	1,624.9	15,196.1
Old Growth	50.0	83.8	1,597.3	1,824.8	552.4	431.0	279.7	570.6	5,389.7
Total:	1,158.3	2,482.0	7,931.3	7,184.4	5,606.6	3,504.6	2,347.7	2,466.4	32,681.3

Productive Forest Area by Provincial Forest Type and Seral Stage



Amount of Old Growth by Provincial Forest Type - 2001 vs. 2006



3.2.4 - Provincial Forest Types within Inventoried AOU

Red and White Pine

White and red pine dominated stands, often mixedwood with overstory of white pine, and a lower canopy of other tree species including poplar, spruce and hardwoods. Most commonly found in the Great Lakes-St. Lawrence forest region and Boreal transitional forests.

Productive Forest Area by 20 Year Age Class

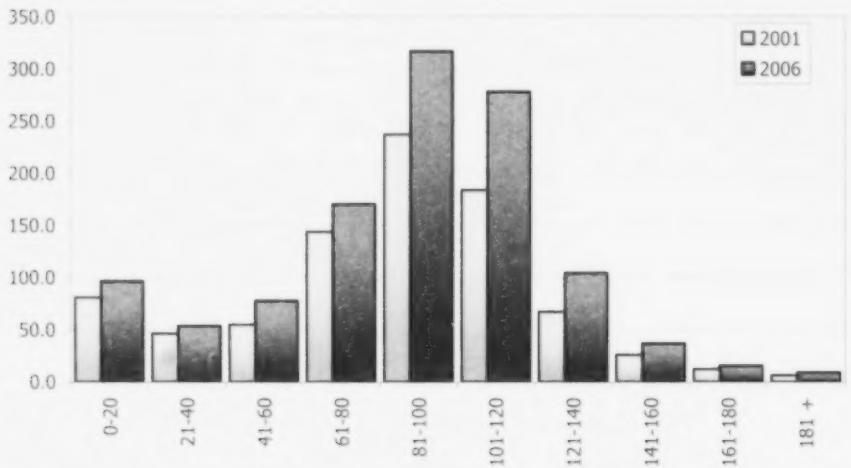
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	83.3	0.5	83.8	3.6	9.1	96.6	8.3%
21-40	39.7	0.3	40.0	1.9	11.8	53.6	4.6%
41-60	47.2	2.1	49.3	6.5	22.0	77.8	6.7%
61-80	101.0	4.6	105.5	21.6	43.2	170.3	14.7%
81-100	202.5	6.7	209.1	58.1	49.4	316.7	27.3%
101-120	195.4	4.3	199.8	40.1	38.1	277.9	24.0%
121-140	74.1	1.4	75.5	17.9	10.7	104.1	9.0%
141-160	23.9	0.4	24.3	10.1	2.4	36.8	3.2%
161-180	9.5	0.5	10.1	4.5	0.9	15.5	1.3%
181 +	5.4	0.3	5.7	2.9	0.3	8.9	0.8%
Total:	782.1	21.0	803.1	167.3	187.9	1,158.3	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	47.8	0.1	47.8	2.3	5.8	56.0	4.8%
Sapling	35.6	0.4	36.0	1.3	3.3	40.6	3.5%
Immature	151.4	5.4	156.8	22.7	64.7	244.1	21.1%
Mature	516.2	14.0	530.2	126.2	111.2	767.6	66.3%
Old Growth	31.2	1.1	32.3	14.8	2.9	50.0	4.3%
Total:	782.1	21.0	803.1	167.3	187.9	1,158.3	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	146,502.8	3,593.8	150,096.5	39,376.0	35,109.8	224,582.3
Net Merchantable Volume	95,334.4	2,389.6	97,724.0	25,809.9	23,205.0	146,738.9
Current Annual Increment	1,062.6	23.1	1,085.8	378.4	194.2	1,658.4
Mean Annual Increment	1,635.4	37.9	1,673.3	498.3	345.1	2,516.6

All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	44.3	3.8%
1	221.9	19.2%
2	732.9	63.3%
3	138.2	11.9%
4	21.0	1.8%
Total	1,158.3	100.0%

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	103,269.2	46.0%
Red Pine	35,099.1	15.6%
Jack Pine	3,383.8	1.5%
Black Spruce	4,094.8	1.8%
White Spruce	7,271.0	3.2%
Balsam Fir	7,045.2	3.1%
Cedar	2,748.2	1.2%
Larch	64.1	0.0%
Hemlock	1,689.6	0.8%
Other Conifers	69.2	0.0%
Poplar	28,428.0	12.7%
White Birch	13,094.4	5.8%
Hard Maple	2,963.8	1.3%
Yellow Birch	940.6	0.4%
Ash	336.3	0.1%
Oak	5,399.6	2.4%
Other Hardwoods	8,685.6	3.9%
Total	224,582.3	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Jack Pine

Jack pine dominated even-aged stands, often on well drained sandy sites. Can be associated with poplar and spruce on some sites, but is generally almost pure jack pine. Most commonly found in the Boreal forest.

Productive Forest Area by 20 Year Age Class

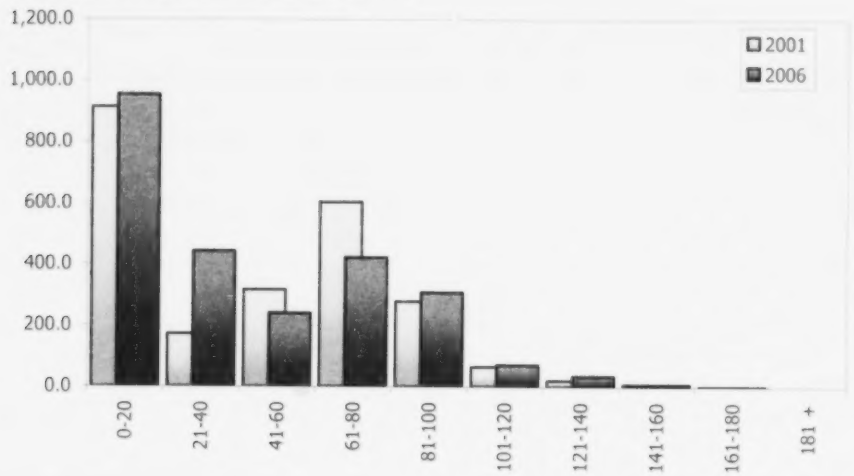
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	908.1	5.7	913.8	24.0	16.6	954.4	38.5%
21-40	388.1	10.3	398.4	35.7	8.9	443.0	17.9%
41-60	207.1	5.9	213.0	20.3	6.9	240.1	9.7%
61-80	361.7	13.6	375.3	34.7	12.3	422.3	17.0%
81-100	265.9	7.5	273.4	30.0	5.0	308.4	12.4%
101-120	59.4	3.2	62.6	8.0	0.4	71.1	2.9%
121-140	29.0	1.2	30.2	3.6	0.4	34.2	1.4%
141-160	6.6	0.2	6.9	0.9	0.1	7.8	0.3%
161-180	0.6	0.0	0.6	0.0	0.0	0.6	0.0%
181 +	0.1	0.0	0.1	0.0	0.0	0.1	0.0%
Total:	2,226.7	47.6	2,274.3	157.1	50.6	2,482.0	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	246.6	0.5	247.2	5.5	4.5	257.1	10.4%
Sapling	661.5	5.2	666.7	18.5	12.1	697.2	28.1%
Immature	657.7	19.1	676.8	61.0	18.5	756.4	30.5%
Mature	589.6	19.7	609.3	63.4	14.8	687.5	27.7%
Old Growth	71.2	3.2	74.4	8.7	0.7	83.8	3.4%
Total:	2,226.7	47.6	2,274.3	157.1	50.6	2,482.0	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	39.6	1.6%
1	542.1	21.8%
2	1,511.8	60.9%
3	357.0	14.4%
4	31.4	1.3%
Total	2,482.0	100.0%

Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	232,351.4	4,453.9	236,805.3	5,496.2	21,906.9	264,208.4
Net Merchantable Volume	148,113.9	3,016.0	151,129.9	3,733.3	14,450.6	169,313.7
Current Annual Increment	2,730.9	45.4	2,776.2	58.7	246.2	3,081.2
Mean Annual Increment	4,189.8	65.5	4,255.3	93.5	357.0	4,705.8

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	377.2	0.1%
Red Pine	300.7	0.1%
Jack Pine	213,074.5	80.6%
Black Spruce	25,124.7	9.5%
White Spruce	429.1	0.2%
Balsam Fir	506.2	0.2%
Cedar	24.3	0.0%
Larch	25.9	0.0%
Hemlock	0.0	0.0%
Other Conifers	0.9	0.0%
Poplar	20,414.8	7.7%
White Birch	3,853.6	1.5%
Hard Maple	0.7	0.0%
Yellow Birch	1.5	0.0%
Ash	0.6	0.0%
Oak	8.6	0.0%
Other Hardwoods	65.2	0.0%
Total	264,208.4	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Conifer Upland

Mixed conifer stands dominated by spruce, pine and fir, with a significant component of poplar, white birch and other upland hardwoods. Occurs on upland or well drained to shallow sites, and is most commonly found in the Boreal forest.

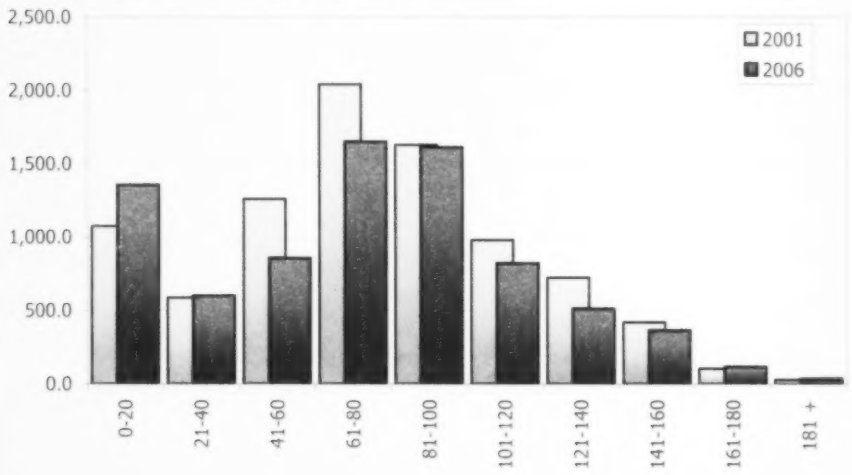
Productive Forest Area by 20 Year Age Class *Area in thousands of hectares*

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	1,251.9	8.0	1,260.0	33.9	61.7	1,355.6	17.1%
21-40	554.7	11.6	566.3	12.4	22.2	600.9	7.6%
41-60	679.7	17.7	697.4	61.0	98.1	856.5	10.8%
61-80	1,265.5	37.4	1,302.9	144.2	202.7	1,649.7	20.8%
81-100	1,274.9	42.4	1,317.3	140.5	153.6	1,611.4	20.3%
101-120	660.8	20.9	681.7	74.7	65.9	822.4	10.4%
121-140	423.5	12.2	435.8	45.3	32.5	513.6	6.5%
141-160	322.5	2.6	325.1	25.6	16.7	367.5	4.6%
161-180	104.4	1.0	105.4	9.2	3.4	117.9	1.5%
181 +	25.3	0.4	25.8	8.5	1.6	35.9	0.5%
Total:	6,563.3	154.3	6,717.6	555.4	658.3	7,931.3	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	372.7	3.1	375.8	13.8	21.4	411.0	5.2%
Sapling	879.2	5.0	884.2	20.2	40.3	944.6	11.9%
Immature	1,467.2	35.9	1,503.1	99.1	166.7	1,769.0	22.3%
Mature	2,513.3	78.8	2,592.1	283.6	333.7	3,209.4	40.5%
Old Growth	1,330.8	31.6	1,362.4	138.8	96.1	1,597.3	20.1%
Total:	6,563.3	154.3	6,717.6	555.4	658.3	7,931.3	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



Volume Statistics by Volume Type and Ownership *Volume in thousands of cubic metres*

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	961,428.8	20,867.9	982,296.7	110,983.3	97,802.5	1,191,082.5
Net Merchantable Volume	578,205.5	12,590.9	590,796.4	62,819.1	59,511.8	713,127.3
Current Annual Increment	8,541.4	195.2	8,736.7	1,078.2	751.2	10,566.0
Mean Annual Increment	11,597.4	252.4	11,849.8	1,373.2	1,095.8	14,318.8

All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	574.1	7.2%
1	3,720.4	46.9%
2	3,052.8	38.5%
3	537.7	6.8%
4	46.3	0.6%
Total	7,931.3	100.0%

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	21,422.3	1.8%
Red Pine	2,472.0	0.2%
Jack Pine	172,088.5	14.4%
Black Spruce	572,153.5	48.0%
White Spruce	43,083.3	3.6%
Balsam Fir	106,711.6	9.0%
Cedar	44,391.7	3.7%
Larch	4,783.6	0.4%
Hemlock	16,262.7	1.4%
Other Conifers	32.1	0.0%
Poplar	121,075.2	10.2%
White Birch	59,035.1	5.0%
Hard Maple	6,256.2	0.5%
Yellow Birch	7,545.9	0.6%
Ash	2,428.4	0.2%
Oak	1,220.9	0.1%
Other Hardwoods	10,119.5	0.8%
Total	1,191,082.5	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Conifer Lowland

Conifer stands dominated by black spruce, often with cedar and larch and black ash. Commonly found on moist to wet soils on lowland sites in the Boreal forest, especially the claybelt area of the northeast, and the far north.

Productive Forest Area by 20 Year Age Class

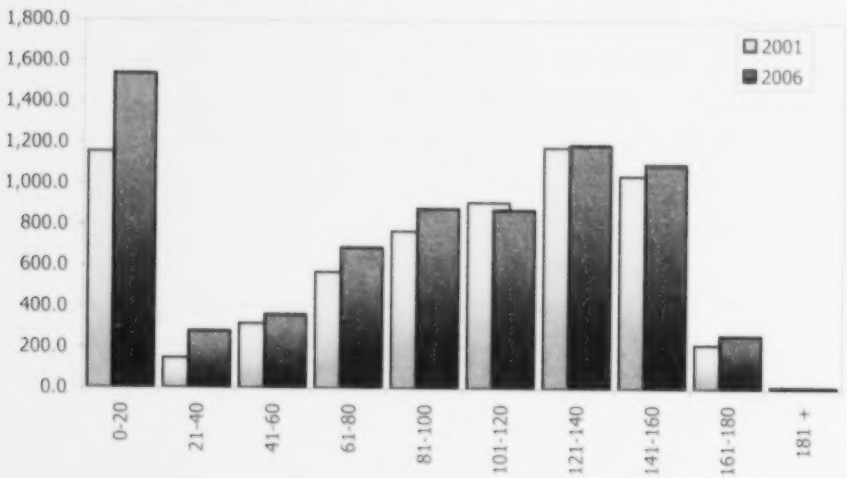
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	1,339.8	12.0	1,351.8	44.4	142.0	1,538.3	21.4%
21-40	247.4	2.9	250.3	9.5	19.8	279.6	3.9%
41-60	292.4	8.4	300.8	15.5	43.4	359.7	5.0%
61-80	544.4	34.0	578.4	38.9	71.4	688.8	9.6%
81-100	680.2	67.0	747.2	61.5	71.3	880.0	12.2%
101-120	650.3	112.6	762.9	64.8	46.1	873.8	12.2%
121-140	829.6	242.4	1,072.0	69.9	49.9	1,191.8	16.6%
141-160	765.4	168.2	933.6	91.8	72.9	1,098.3	15.3%
161-180	185.9	58.8	244.7	12.4	5.5	262.7	3.7%
181 +	8.4	2.0	10.4	0.8	0.2	11.3	0.2%
Total:	5,543.9	708.3	6,252.2	409.6	522.6	7,184.4	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	720.3	7.9	728.2	24.5	39.9	792.7	11.0%
Sapling	800.3	5.7	806.0	26.1	110.3	942.5	13.1%
Immature	720.3	29.9	750.2	44.5	103.1	897.9	12.5%
Mature	2,034.0	331.4	2,365.4	187.1	174.1	2,726.6	38.0%
Old Growth	1,269.0	333.4	1,602.4	127.3	95.1	1,824.8	25.4%
Total:	5,543.9	708.3	6,252.2	409.6	522.6	7,184.4	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	93.1	1.3%
1	1,539.7	21.4%
2	3,015.4	42.0%
3	1,763.6	24.5%
4	772.7	10.8%
Total	7,184.4	100.0%

Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	650,387.9	49,679.0	700,067.0	58,226.4	56,688.4	814,981.8
Net Merchantable Volume	358,088.5	25,252.1	383,340.6	30,294.7	32,123.1	445,758.4
Current Annual Increment	4,358.5	212.4	4,570.9	464.8	309.9	5,345.7
Mean Annual Increment	6,102.4	375.4	6,477.7	584.0	495.7	7,557.5

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	350.6	0.0%
Red Pine	2.7	0.0%
Jack Pine	5,928.1	0.7%
Black Spruce	670,239.5	82.2%
White Spruce	1,736.6	0.2%
Balsam Fir	9,810.4	1.2%
Cedar	50,866.6	6.2%
Larch	53,575.3	6.6%
Hemlock	4.5	0.0%
Other Conifers	1.7	0.0%
Poplar	16,280.5	2.0%
White Birch	5,427.9	0.7%
Hard Maple	0.0	0.0%
Yellow Birch	0.0	0.0%
Ash	709.8	0.1%
Oak	0.0	0.0%
Other Hardwoods	47.6	0.0%
Total	814,981.8	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Mixedwood

Mixedwood forest composed of mostly spruce, poplar, jack pine, balsam fir, and white birch. Occuring on a wide variety of sites, mixedwood stands are commonly found throughout the Boreal and Boreal transitional forest.

Productive Forest Area by 20 Year Age Class

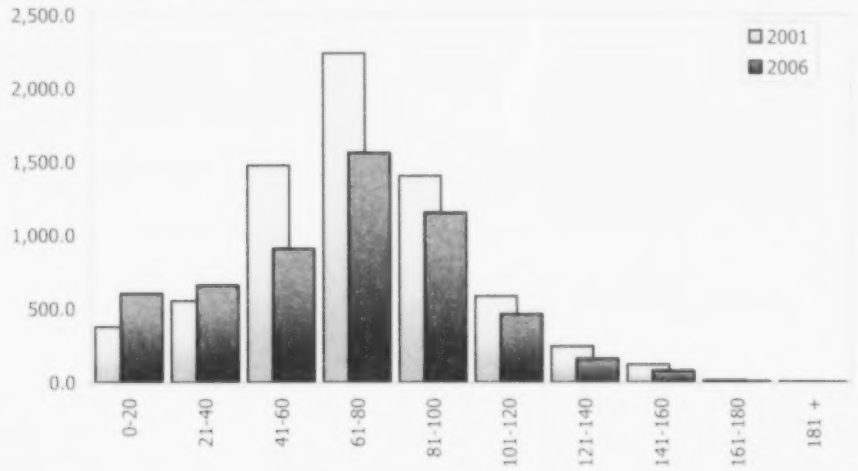
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	586.4	3.4	589.8	11.2	5.0	606.0	10.8%
21-40	602.2	10.1	612.3	20.3	28.6	661.2	11.8%
41-60	691.5	25.7	717.2	70.5	122.3	910.0	16.2%
61-80	1,144.5	62.0	1,206.6	131.5	223.3	1,561.3	27.8%
81-100	886.0	49.4	935.4	111.6	106.6	1,153.6	20.6%
101-120	361.7	23.6	385.3	44.9	32.8	463.1	8.3%
121-140	132.8	5.3	138.1	15.1	8.5	161.6	2.9%
141-160	64.0	0.9	64.8	6.3	8.5	79.6	1.4%
161-180	6.1	0.1	6.2	0.7	0.1	7.0	0.1%
181 +	3.0	0.0	3.0	0.1	0.1	3.2	0.1%
Total:	4,478.1	180.5	4,658.6	412.3	535.7	5,606.6	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	168.9	1.4	170.3	2.7	0.4	173.4	3.1%
Sapling	417.5	1.9	419.5	8.6	4.6	432.6	7.7%
Immature	1,293.6	35.8	1,329.5	90.8	151.0	1,571.2	28.0%
Mature	2,157.6	118.3	2,275.9	260.2	340.9	2,877.0	51.3%
Old Growth	440.5	23.0	463.5	50.0	38.8	552.4	9.9%
Total:	4,478.1	180.5	4,658.6	412.3	535.7	5,606.6	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	617,490.0	21,211.3	638,701.3	84,975.5	63,220.6	786,897.4
Net Merchantable Volume	354,304.5	12,506.8	366,811.3	48,474.2	36,694.5	451,980.0
Current Annual Increment	7,058.2	191.6	7,249.8	948.6	574.2	8,772.6
Mean Annual Increment	8,878.6	266.8	9,145.4	1,168.5	801.5	11,115.4

All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	268.0	4.8%
1	1,471.2	26.2%
2	2,408.4	43.0%
3	1,340.3	23.9%
4	118.6	2.1%
Total	5,606.6	100.0%

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	13,746.5	1.7%
Red Pine	2,826.7	0.4%
Jack Pine	87,358.7	11.1%
Black Spruce	155,484.4	19.8%
White Spruce	29,621.0	3.8%
Balsam Fir	61,369.7	7.8%
Cedar	17,389.1	2.2%
Larch	724.2	0.1%
Hemlock	1,098.0	0.1%
Other Conifers	348.6	0.0%
Poplar	279,142.1	35.5%
White Birch	123,931.5	15.7%
Hard Maple	2,702.8	0.3%
Yellow Birch	2,044.6	0.3%
Ash	1,130.8	0.1%
Oak	512.7	0.1%
Other Hardwoods	7,466.1	0.9%
Total	786,897.4	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Poplar

Poplar (aspen) dominated sites, often associated with some white birch, spruce, jack pine and balsam fir. Occurs mostly on deep, fresh upland sites. Most commonly found in the Boreal forest.

Productive Forest Area by 20 Year Age Class

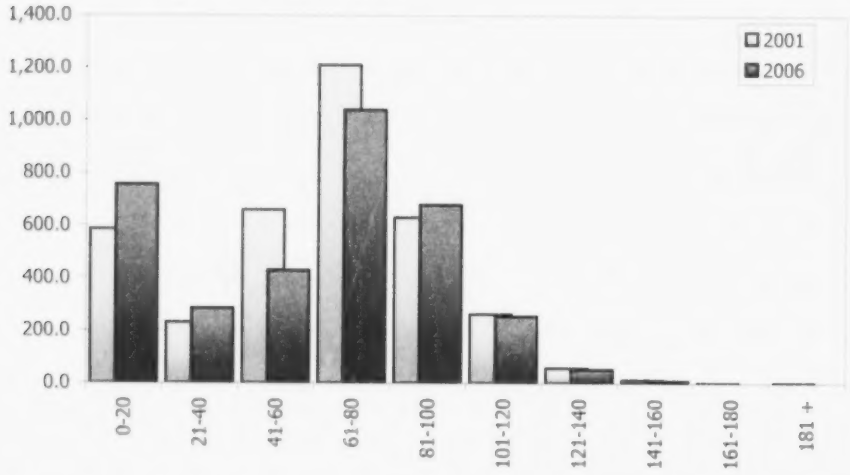
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	608.9	2.5	611.4	23.7	120.6	755.6	21.6%
21-40	218.8	4.8	223.7	6.7	54.1	284.5	8.1%
41-60	283.8	9.2	293.0	22.9	113.0	428.9	12.2%
61-80	657.0	30.2	687.3	67.6	286.0	1,040.9	29.7%
81-100	524.9	22.9	547.8	55.3	75.7	678.8	19.4%
101-120	207.7	4.4	212.1	28.2	14.4	254.6	7.3%
121-140	45.1	0.9	46.0	3.7	2.8	52.6	1.5%
141-160	7.1	0.2	7.3	0.6	0.4	8.3	0.2%
161-180	0.3	0.0	0.3	0.0	0.0	0.3	0.0%
181 +	0.1	0.0	0.1	0.0	0.0	0.1	0.0%
Total:	2,553.8	75.1	2,628.9	208.7	667.0	3,504.6	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	197.2	0.7	197.9	4.6	23.1	225.7	6.4%
Sapling	294.6	1.0	295.6	16.0	67.6	379.2	10.8%
Immature	523.6	10.5	534.1	23.5	140.9	698.4	19.9%
Mature	1,186.1	54.3	1,240.4	120.7	409.1	1,770.2	50.5%
Old Growth	352.2	8.6	360.8	43.9	26.3	431.0	12.3%
Total:	2,553.8	75.1	2,628.9	208.7	667.0	3,504.6	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	426,083.1	10,718.6	436,801.7	107,056.6	40,005.7	583,864.0
Net Merchantable Volume	262,085.3	6,864.9	268,950.2	66,764.5	25,141.1	360,855.8
Current Annual Increment	3,763.5	88.8	3,852.4	1,196.3	272.3	5,320.9
Mean Annual Increment	5,794.9	141.6	5,936.5	1,569.9	492.2	7,998.6

All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	22.4	0.6%
1	248.0	7.1%
2	2,117.7	60.4%
3	1,042.7	29.8%
4	74.0	2.1%
Total	3,504.6	100.0%

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	3,735.7	0.6%
Red Pine	841.9	0.1%
Jack Pine	15,075.7	2.6%
Black Spruce	24,487.4	4.2%
White Spruce	8,904.6	1.5%
Balsam Fir	14,983.2	2.6%
Cedar	991.8	0.2%
Larch	102.5	0.0%
Hemlock	95.2	0.0%
Other Conifers	0.5	0.0%
Poplar	464,870.0	79.6%
White Birch	41,884.9	7.2%
Hard Maple	1,061.5	0.2%
Yellow Birch	138.7	0.0%
Ash	1,570.1	0.3%
Oak	627.3	0.1%
Other Hardwoods	4,493.0	0.8%
Total	583,864.0	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

White Birch

White birch dominated stands, with some poplar, spruce and fir. Often found with spruce/fir understory. Typically found on fresh to moist sandy sites. Most commonly found in the Boreal forest.

Productive Forest Area by 20 Year Age Class

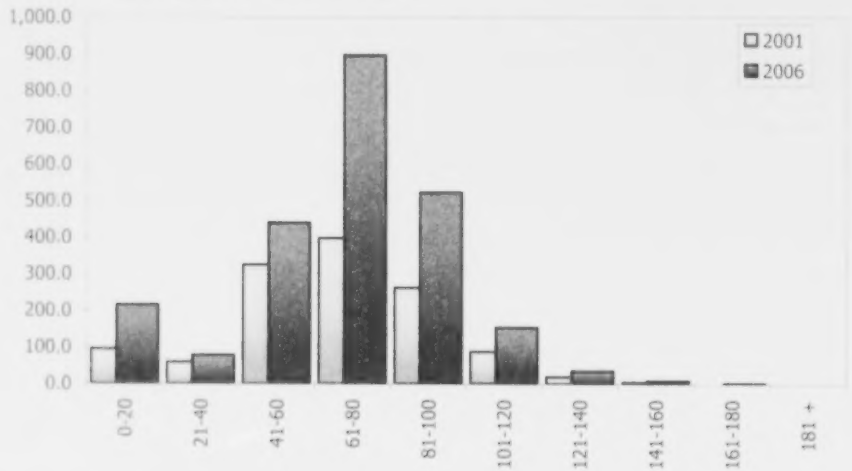
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	182.4	1.1	183.5	10.2	20.9	214.7	9.1%
21-40	60.6	1.8	62.4	6.5	8.5	77.4	3.3%
41-60	278.6	19.6	298.2	45.8	95.2	439.2	18.7%
61-80	534.7	48.7	583.5	98.0	214.2	895.7	38.2%
81-100	339.5	25.1	364.6	60.3	97.5	522.4	22.3%
101-120	110.1	7.2	117.2	15.1	21.4	153.7	6.5%
121-140	26.3	1.1	27.4	3.3	4.6	35.3	1.5%
141-160	6.3	0.0	6.3	0.7	0.8	7.8	0.3%
161-180	0.7	0.0	0.8	0.1	0.6	1.4	0.1%
181 +	0.1	0.1	0.2	0.0	0.1	0.3	0.0%
Total:	1,539.2	104.7	1,643.9	239.9	463.9	2,347.7	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	71.1	0.4	71.6	4.0	3.7	79.2	3.4%
Sapling	86.8	0.4	87.2	5.4	13.4	106.0	4.5%
Immature	245.7	11.6	257.2	31.4	61.0	349.7	14.9%
Mature	938.9	78.5	1,017.4	170.6	345.1	1,533.0	65.3%
Old Growth	196.7	13.8	210.5	28.5	40.8	279.7	11.9%
Total:	1,539.2	104.7	1,643.9	239.9	463.9	2,347.7	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	212,032.2	10,247.5	222,279.7	72,339.4	32,223.7	326,842.7
Net Merchantable Volume	125,829.7	6,200.9	132,030.6	44,251.1	19,205.6	195,487.4
Current Annual Increment	1,962.3	91.1	2,053.4	761.1	295.2	3,109.7
Mean Annual Increment	2,876.9	136.8	3,013.7	982.0	431.8	4,427.5

All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	47.4	2.0%
1	233.2	9.9%
2	1,030.0	43.9%
3	898.8	38.3%
4	138.3	5.9%
Total	2,347.7	100.0%

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	11,833.9	3.6%
Red Pine	1,051.1	0.3%
Jack Pine	6,147.8	1.9%
Black Spruce	13,054.5	4.0%
White Spruce	10,378.8	3.2%
Balsam Fir	15,795.8	4.8%
Cedar	2,986.1	0.9%
Larch	50.2	0.0%
Hemlock	959.2	0.3%
Other Conifers	5.7	0.0%
Poplar	90,720.5	27.8%
White Birch	125,494.8	38.4%
Hard Maple	12,996.3	4.0%
Yellow Birch	3,115.5	1.0%
Ash	1,296.9	0.4%
Oak	3,544.8	1.1%
Other Hardwoods	27,410.9	8.4%
Total	326,842.7	100.0%

3.2.4 - Provincial Forest Types within Inventoried AOU

Tolerant Hardwoods

Tolerant hardwood stands, generally maple, with a lesser component of yellow birch, oak, beech, basswood, elm and ash. Dominant forest type in the Great Lakes-St. Lawrence forest region.

Productive Forest Area by 20 Year Age Class

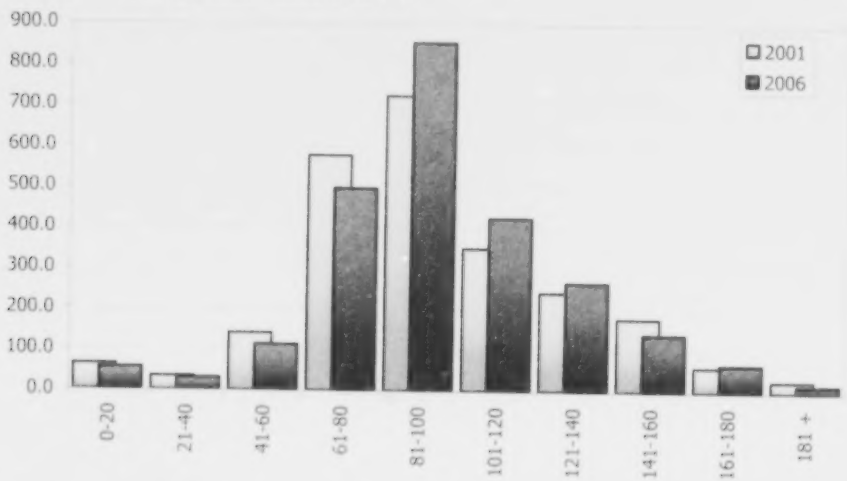
Area in thousands of hectares

Age Class	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
0-20	28.2	0.4	28.6	2.8	24.1	55.5	2.3%
21-40	15.9	0.5	16.3	0.7	12.8	29.8	1.2%
41-60	39.4	2.2	41.6	6.4	64.7	112.7	4.6%
61-80	187.5	11.4	198.9	28.7	269.3	496.9	20.1%
81-100	369.4	13.3	382.8	53.5	418.0	854.3	34.6%
101-120	231.6	3.7	235.3	25.2	164.8	425.3	17.2%
121-140	184.2	1.2	185.4	21.3	60.4	267.0	10.8%
141-160	96.1	0.4	96.4	24.4	19.7	140.5	5.7%
161-180	53.9	0.2	54.1	5.9	7.1	67.0	2.7%
181 +	11.7	0.2	11.9	3.9	1.5	17.3	0.7%
Total:	1,217.8	33.5	1,251.3	172.7	1,042.4	2,466.4	100.0%

Productive Forest Area by Seral Stage

Seral Stage	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Pre-Sapling	21.3	0.3	21.6	2.0	16.7	40.3	1.6%
Sapling	9.9	0.2	10.1	1.0	8.6	19.7	0.8%
Immature	79.2	4.4	83.6	11.7	115.7	210.9	8.6%
Mature	710.6	26.3	736.9	98.9	789.0	1,624.9	65.9%
Old Growth	396.8	2.3	399.1	59.2	112.3	570.6	23.1%
Total:	1,217.8	33.5	1,251.3	172.7	1,042.4	2,466.4	100.0%

Area by 20 Year Age Class - 2001 vs. 2006



All Forest Area by Site Class

Site Class	Area ('000's ha)	%
0	196.0	7.9%
1	933.3	37.8%
2	997.0	40.4%
3	312.3	12.7%
4	27.7	1.1%
Total	2,466.4	100.0%

Volume Statistics by Volume Type and Ownership

Volume in thousands of cubic metres

Volume Statistics	Crown Production	Crown Protection	Crown Subtotal	Protected Areas	Other	Total
Gross Total Volume	238,322.3	5,019.1	243,341.4	210,998.8	33,614.2	487,954.4
Net Merchantable Volume	156,425.0	3,366.1	159,791.1	139,759.4	22,165.0	321,715.5
Current Annual Increment	1,698.1	48.8	1,746.9	2,009.9	220.6	3,977.4
Mean Annual Increment	2,326.3	58.5	2,384.8	2,364.5	319.0	5,068.3

Volume in thousands of cubic metres

Volume by Tree Species	Gross Total Volume	%
White Pine	14,812.6	3.0%
Red Pine	446.7	0.1%
Jack Pine	242.1	0.0%
Black Spruce	1,720.6	0.4%
White Spruce	8,500.3	1.7%
Balsam Fir	14,023.6	2.9%
Cedar	10,894.9	2.2%
Larch	498.5	0.1%
Hemlock	21,638.9	4.4%
Other Conifers	20.2	0.0%
Poplar	26,976.2	5.5%
White Birch	17,644.9	3.6%
Hard Maple	216,997.2	44.5%
Yellow Birch	46,582.2	9.5%
Ash	12,834.9	2.6%
Oak	32,966.3	6.8%
Other Hardwoods	61,154.3	12.5%
Total	487,954.4	100.0%

3.3.1 - Total Growing Stock - Ontario Totals

Gross Total Volume (GTV) - All Forest

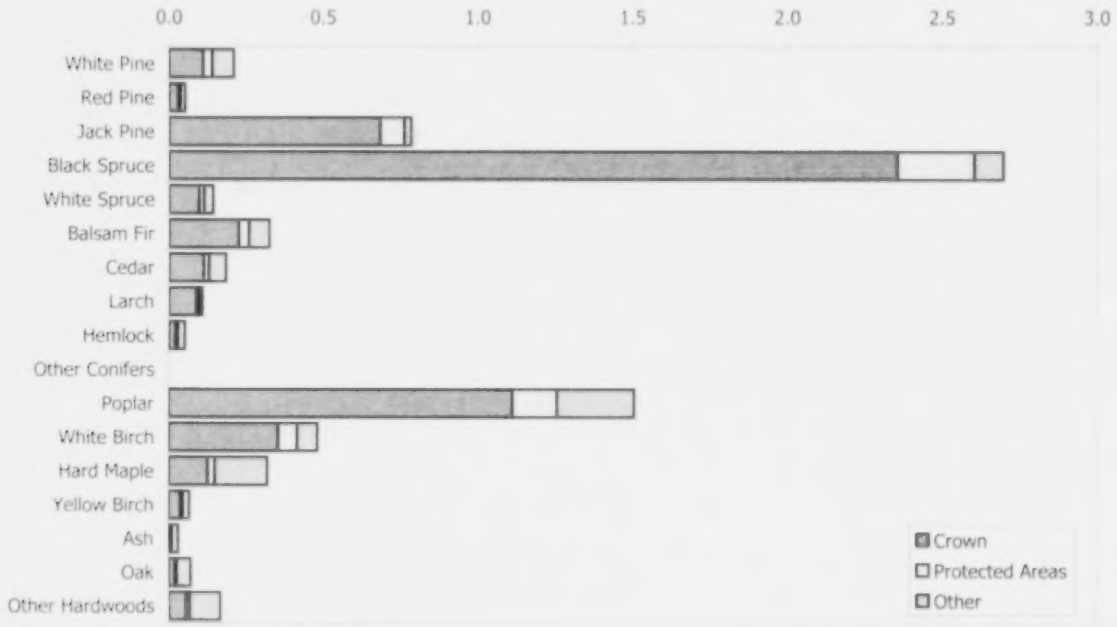
Volume in thousands of cubic metres

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	110,764.7	29,093.4	70,908.1	210,766.2	2.9%
Red Pine	29,254.8	6,892.5	16,493.1	52,640.4	0.7%
Jack Pine	684,158.8	78,237.1	22,653.5	785,049.4	10.9%
Black Spruce	2,356,200.6	249,000.6	94,687.4	2,699,888.6	37.4%
White Spruce	97,825.2	15,124.2	31,035.5	143,984.9	2.0%
Balsam Fir	225,127.2	33,511.6	67,389.6	326,028.4	4.5%
Cedar	112,578.7	16,370.7	56,288.8	185,238.1	2.6%
Larch	87,954.5	9,471.4	11,363.0	108,788.9	1.5%
Hemlock	21,392.6	6,902.2	23,871.2	52,165.9	0.7%
Other Conifers	36.8	11.0	538.7	586.5	0.0%
Poplar	1,111,886.5	145,068.4	250,130.2	1,507,085.2	20.9%
White Birch	354,490.0	62,046.8	66,078.5	482,615.3	6.7%
Hard Maple	125,977.2	22,972.5	171,153.7	320,103.3	4.4%
Yellow Birch	38,156.0	7,110.0	22,384.6	67,650.6	0.9%
Ash	6,809.4	1,949.7	22,695.1	31,454.2	0.4%
Oak	19,725.8	5,262.7	46,970.0	71,958.4	1.0%
Other Hardwoods	55,093.4	12,024.4	100,144.6	167,262.4	2.3%
Total	5,437,432.2	701,049.1	1,074,785.5	7,213,266.8	100.0%

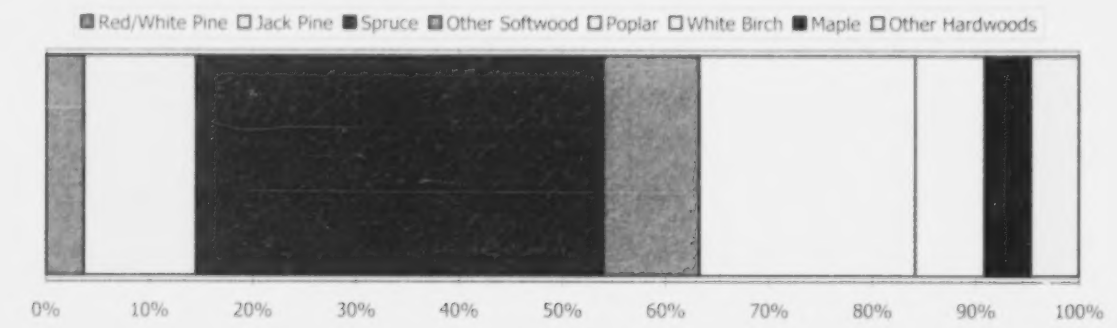
** Estimate based on FRI and satellite data, using growth and yield data extrapolated to satellite classes*

Gross Total Volume by Species and Ownership

Volume in billions of cubic metres



Total Volume Growing Stock by Species Group



3.3.1 - Total Growing Stock & Growth - Ontario Totals

Net Merchantable Volume (NMV) - All Forest

Volume in thousands of cubic metres

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	73,138.8	19,489.5	46,476.5	139,104.9	3.2%
Red Pine	21,572.8	5,235.9	11,984.7	38,793.4	0.9%
Jack Pine	469,269.6	54,624.1	16,369.8	540,263.5	12.6%
Black Spruce	1,371,898.1	146,113.7	52,843.5	1,570,855.2	36.5%
White Spruce	58,634.5	9,042.3	18,413.2	86,089.9	2.0%
Balsam Fir	82,815.3	12,671.3	28,198.2	123,684.7	2.9%
Cedar	35,434.5	5,273.5	20,194.9	60,902.9	1.4%
Larch	28,886.8	3,168.5	4,145.6	36,200.9	0.8%
Hemlock	14,711.6	4,740.9	16,533.3	35,985.9	0.8%
Other Conifers	9.6	3.5	148.3	161.5	0.0%
Poplar	683,576.9	90,474.6	163,195.1	937,246.6	21.8%
White Birch	209,643.6	37,094.1	40,311.1	287,048.9	6.7%
Hard Maple	80,004.6	14,519.6	109,037.7	203,561.9	4.7%
Yellow Birch	28,443.8	5,254.8	16,810.0	50,508.7	1.2%
Ash	4,848.5	1,377.4	15,627.8	21,853.8	0.5%
Oak	14,611.6	3,854.6	34,632.1	53,098.3	1.2%
Other Hardwoods	38,906.5	8,521.0	71,321.7	118,749.2	2.8%
Total	3,216,407.1	421,459.5	666,243.8	4,304,110.3	100.0%

Current Annual Increment (CAI) - All Forest

Volume in thousands of cubic metres annually

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	974.4	233.9	639.1	1,847.3	2.9%
Red Pine	252.7	36.1	211.5	500.3	0.8%
Jack Pine	6,187.2	672.4	188.8	7,048.4	11.2%
Black Spruce	19,207.2	2,007.5	903.8	22,118.5	35.1%
White Spruce	1,247.0	176.5	386.0	1,809.5	2.9%
Balsam Fir	3,303.9	449.6	862.2	4,615.8	7.3%
Cedar	796.1	123.5	498.8	1,418.4	2.3%
Larch	649.9	65.9	109.6	825.4	1.3%
Hemlock	117.9	38.6	204.6	361.0	0.6%
Other Conifers	0.6	0.2	15.4	16.2	0.0%
Poplar	9,597.3	1,085.4	2,115.2	12,797.9	20.3%
White Birch	2,427.7	369.9	367.5	3,165.1	5.0%
Hard Maple	942.9	158.6	1,745.7	2,847.2	4.5%
Yellow Birch	257.3	42.6	185.3	485.1	0.8%
Ash	78.4	23.1	297.5	399.0	0.6%
Oak	203.0	56.3	494.3	753.5	1.2%
Other Hardwoods	612.0	133.4	1,179.4	1,924.8	3.1%
Total	46,855.4	5,673.5	10,404.4	62,933.3	100.0%

Mean Annual Increment (MAI) - All Forest

Volume in thousands of cubic metres annually

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	1,242.1	309.3	826.5	2,378.0	2.7%
Red Pine	410.3	77.9	274.4	762.6	0.9%
Jack Pine	11,266.0	1,231.2	354.7	12,851.9	14.8%
Black Spruce	23,923.3	2,524.5	1,023.2	27,471.0	31.6%
White Spruce	1,220.7	179.6	396.3	1,796.6	2.1%
Balsam Fir	3,040.9	431.3	874.8	4,347.1	5.0%
Cedar	1,045.4	157.5	615.7	1,818.6	2.1%
Larch	829.4	87.5	127.1	1,044.0	1.2%
Hemlock	170.4	53.8	258.6	482.7	0.6%
Other Conifers	0.5	0.2	10.8	11.6	0.0%
Poplar	15,080.7	1,871.7	3,411.1	20,363.5	23.4%
White Birch	4,788.4	814.6	872.1	6,475.1	7.4%
Hard Maple	1,213.0	214.1	1,895.9	3,323.1	3.8%
Yellow Birch	350.5	61.7	224.4	636.7	0.7%
Ash	80.2	23.4	287.6	391.2	0.4%
Oak	221.0	59.9	531.4	812.3	0.9%
Other Hardwoods	639.7	139.2	1,197.4	1,976.3	2.3%
Total	65,522.8	8,237.5	13,181.8	86,942.1	100.0%

3.3.2 - Total Growing Stock - AOU

Gross Total Volume (GTV) - All Forest within AOU

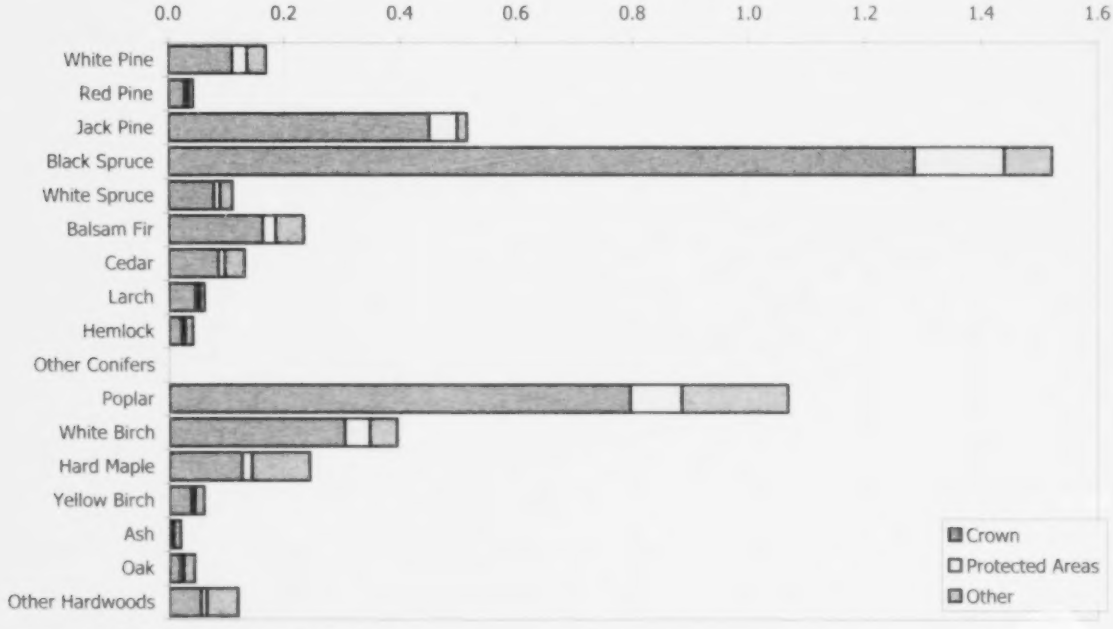
Volume in thousands of cubic metres

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	110,356.3	25,514.3	33,728.3	169,598.9	3.5%
Red Pine	28,415.3	5,831.3	8,862.1	43,108.6	0.9%
Jack Pine	449,608.3	48,203.7	17,804.0	515,616.0	10.8%
Black Spruce	1,285,429.1	154,523.1	82,693.8	1,522,646.0	31.9%
White Spruce	78,497.0	10,380.0	22,195.7	111,072.8	2.3%
Balsam Fir	162,308.8	22,515.7	49,016.7	233,841.2	4.9%
Cedar	86,050.6	10,591.9	35,146.4	131,788.9	2.8%
Larch	46,802.0	5,732.0	9,444.2	61,978.2	1.3%
Hemlock	21,377.6	6,099.4	14,271.1	41,748.1	0.9%
Other Conifers	34.6	4.4	440.0	479.0	0.0%
Poplar	795,354.9	88,211.4	183,765.9	1,067,332.2	22.3%
White Birch	303,009.4	43,009.5	47,694.0	393,712.8	8.2%
Hard Maple	125,904.9	16,446.4	100,630.9	242,982.3	5.1%
Yellow Birch	38,130.4	5,417.4	16,824.1	60,371.8	1.3%
Ash	6,285.4	1,298.7	12,762.0	20,346.2	0.4%
Oak	19,718.5	4,398.6	20,163.2	44,280.3	0.9%
Other Hardwoods	55,058.6	9,191.6	55,200.5	119,450.8	2.5%
Total	3,612,341.8	457,369.3	710,643.1	4,780,354.2	100.0%

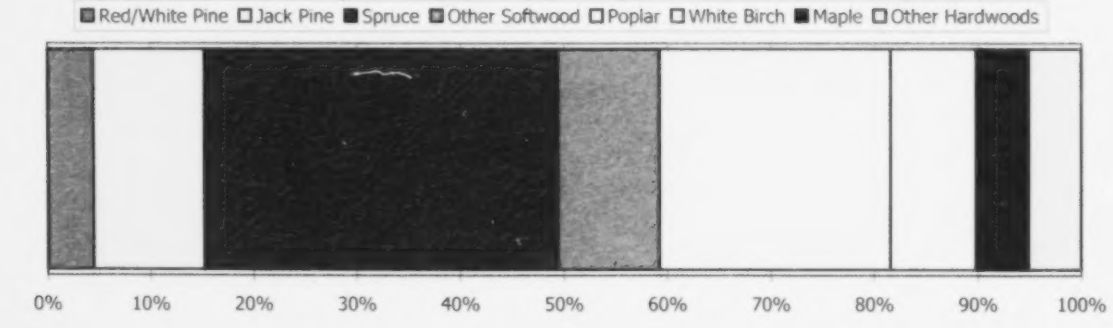
** Estimate based on FRI and satellite data, using growth and yield data extrapolated to satellite classes*

Gross Total Volume by Species and Ownership

Volume in billions of cubic metres



Total Volume Growing Stock by Species Group



3.3.2 - Total Growing Stock & Growth - AOU

Net Merchantable Volume (NMV) - All Forest

Volume in thousands of cubic metres

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	72,870.0	17,141.7	22,019.4	112,031.1	3.9%
Red Pine	20,942.6	4,451.4	6,399.5	31,793.5	1.1%
Jack Pine	308,920.2	34,005.0	12,911.6	355,836.8	12.4%
Black Spruce	744,778.4	91,446.4	45,809.4	882,034.3	30.8%
White Spruce	46,537.3	6,311.1	12,695.8	65,544.2	2.3%
Balsam Fir	60,414.8	8,588.7	20,067.6	89,071.0	3.1%
Cedar	27,833.6	3,422.4	12,460.3	43,716.4	1.5%
Larch	15,753.4	1,913.9	3,417.5	21,084.7	0.7%
Hemlock	14,701.4	4,186.9	9,938.3	28,826.6	1.0%
Other Conifers	9.6	1.6	120.6	131.9	0.0%
Poplar	492,755.6	55,002.6	119,821.8	667,580.0	23.3%
White Birch	179,839.1	25,752.1	28,890.3	234,481.5	8.2%
Hard Maple	79,958.8	10,376.3	64,235.3	154,570.4	5.4%
Yellow Birch	28,424.8	3,993.3	12,622.0	45,040.1	1.6%
Ash	4,483.0	925.4	8,763.7	14,172.1	0.5%
Oak	14,606.2	3,222.0	14,805.5	32,633.8	1.1%
Other Hardwoods	38,882.7	6,526.8	39,306.6	84,716.1	3.0%
Total	2,151,711.6	277,267.7	434,285.2	2,863,264.4	100.0%

Current Annual Increment (CAI) - All Forest

Volume in thousands of cubic metres annually

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	970.7	201.0	314.5	1,486.3	3.5%
Red Pine	247.6	26.8	127.4	401.7	0.9%
Jack Pine	4,085.5	395.3	152.3	4,633.1	10.9%
Black Spruce	11,159.7	1,201.8	802.4	13,163.9	30.9%
White Spruce	998.2	113.0	293.7	1,404.8	3.3%
Balsam Fir	2,313.3	288.2	662.1	3,263.5	7.7%
Cedar	635.2	80.7	311.4	1,027.4	2.4%
Larch	347.5	37.1	92.4	477.0	1.1%
Hemlock	117.8	33.1	120.5	271.5	0.6%
Other Conifers	0.6	0.1	12.7	13.4	0.0%
Poplar	7,084.2	569.1	1,714.3	9,367.7	22.0%
White Birch	2,042.5	239.5	286.8	2,568.9	6.0%
Hard Maple	942.3	105.6	1,014.9	2,062.8	4.8%
Yellow Birch	257.1	30.5	141.1	428.7	1.0%
Ash	71.5	14.9	167.9	254.2	0.6%
Oak	202.9	47.2	214.7	464.7	1.1%
Other Hardwoods	611.7	100.9	646.8	1,359.4	3.2%
Total	32,088.3	3,484.7	7,075.9	42,648.9	100.0%

Mean Annual Increment (MAI) - All Forest

Volume in thousands of cubic metres annually

Species	Crown	Protected Areas	Other	Total	Proportion
White Pine	1,237.6	268.9	398.5	1,904.9	3.2%
Red Pine	400.0	63.0	156.0	619.0	1.1%
Jack Pine	7,511.0	729.4	281.3	8,521.8	14.5%
Black Spruce	13,421.6	1,545.9	898.7	15,866.2	27.0%
White Spruce	975.6	119.3	290.6	1,385.4	2.4%
Balsam Fir	2,158.3	283.1	650.1	3,091.4	5.3%
Cedar	821.6	102.4	381.5	1,305.4	2.2%
Larch	443.5	51.4	105.8	600.8	1.0%
Hemlock	170.2	46.5	153.1	369.8	0.6%
Other Conifers	0.5	0.1	8.9	9.5	0.0%
Poplar	11,020.8	1,081.8	2,583.2	14,685.9	25.0%
White Birch	4,101.7	553.4	647.4	5,302.5	9.0%
Hard Maple	1,212.3	149.0	1,111.0	2,472.3	4.2%
Yellow Birch	350.3	45.8	170.0	566.1	1.0%
Ash	73.8	15.3	162.0	251.1	0.4%
Oak	221.0	50.2	229.4	500.5	0.9%
Other Hardwoods	639.4	105.8	657.9	1,403.1	2.4%
Total	44,759.2	5,211.4	8,885.3	58,855.9	100.0%

3.3.3 - Trends in Growing Stock - AOU

Gross Total Volume (GTV) - Estimated Volume from Previous Forest Resources of Ontario Documents

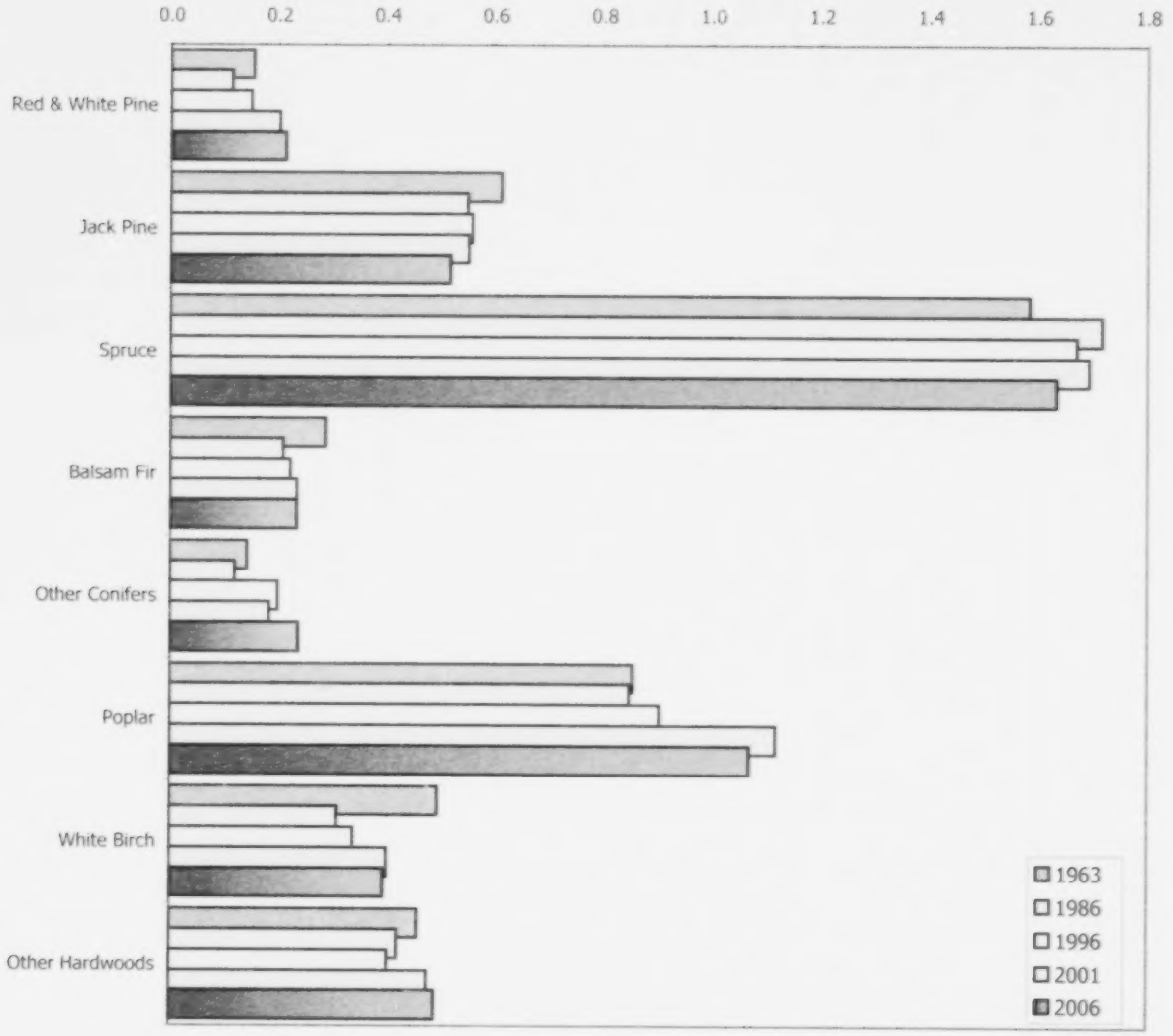
All Volume in thousands of cubic metres

Species	1963	1986	1996	2001	2006	2006 Proportion
Red & White Pine	152,479.8	112,178.3	147,650.8	201,129.6	212,707.6	4.4%
Jack Pine	611,492.9	547,170.1	555,702.5	549,431.4	515,616.0	10.8%
Spruce	1,585,038.6	1,716,833.5	1,670,259.4	1,693,589.0	1,633,718.7	34.2%
Balsam Fir	286,365.8	208,296.2	221,497.6	233,675.1	233,841.2	4.9%
Other Conifers	140,797.0	117,922.9	198,001.8	182,181.4	235,994.3	4.9%
Poplar	853,314.2	847,347.0	901,934.5	1,115,874.2	1,067,332.2	22.3%
White Birch	492,709.9	306,689.6	336,813.1	399,917.3	393,712.8	8.2%
Other Hardwoods	456,372.3	419,549.0	401,874.4	473,766.5	487,431.3	10.2%
Estimated Totals:	4,578,570.5	4,275,986.6	4,433,734.1	4,849,564.6	4,780,354.2	100.0%

** Since each document generally covers all inventoried forest, growing stock was reduced to represent the AOU. Estimate accuracy increases dramatically in 2001 and 2006 over previous reports.*

Gross Total Volume by Species over Time

Volume in billions of cubic metres



4 - Geographic Profiles

Ontario can be subdivided into several different geographical areas based on forest science and ecology as well as administrative boundaries and land ownership. This chapter focuses on these geographic profiles and provides a detailed breakdown of each, in a standard format. These profiles include:

4.1 – Forest Regions
4.2 – Management Zones
4.3 – Ownerships
4.4 – Administrative Regions
4.5 – Ecological Land Classification (ELC)

4.1 - Forest Regions of Ontario

There are four major forest regions present in Ontario:

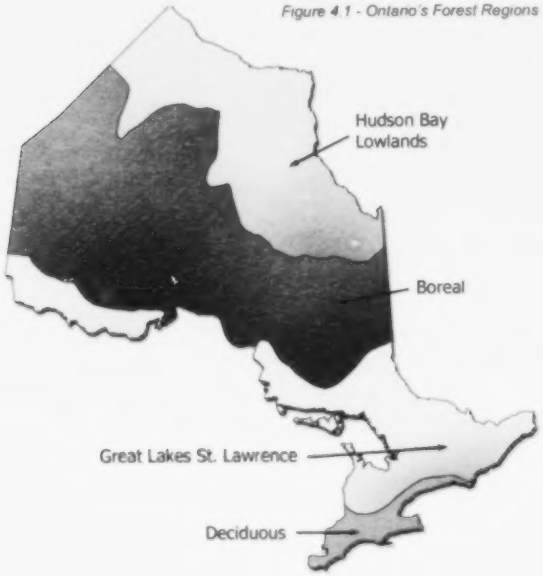
- the Deciduous forest region in southern Ontario
- the Great Lakes-St. Lawrence forest region in southern and central Ontario
- the Boreal forest region in northern Ontario
- the Hudson Bay Lowlands in the far north

Each forest region is characterized by its climate, forest ecosystems and wildlife species. North-south gradients in temperature and east-west gradients in precipitation largely determine the extent of these forest regions. Most of Ontario's population lives within the Great Lakes-St. Lawrence and Deciduous forest regions.

Great Lakes St. Lawrence Forest - Red Pine - Simcoe County

Broad zones of natural transition occur between forest regions. As a result, certain tree species may appear in what seem to be inappropriate forest regions, for example, the occurrence of maple or white pine in the southern reaches of the Boreal forest. In some locations, the transition zone may be more than 100 kilometres wide.

Figure 4.1 - Ontario's Forest Regions



4.2 - Management Zones of Ontario

Ontario is divided into three management zones for the purpose of forest management.

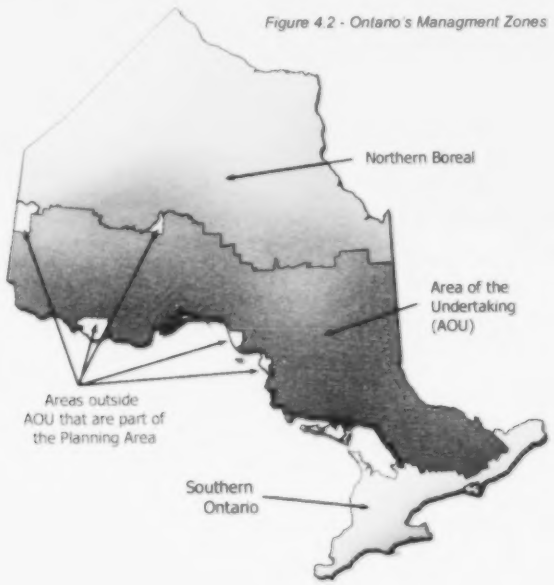
- the Northern Boreal forest
- the Area of the Undertaking (and Planning Area)
- Southern Ontario

The Northern Boreal Forest describes the large expanse of boreal and Hudson Bay lowlands in the far north. No Crown forest management activity takes place in this largely inaccessible tract of wilderness. The Area of the Undertaking (AOU) refers to the middle zone where most forest management is currently practiced. Southern Ontario is the area south of the AOU where most of the population in the province lives

In the 2001 version of the Forest Resources of Ontario, the AOU was represented as "the Planning Area", which was a slightly modified version of the AOU. In this version a summary of the planning area is included in Chapters 3 and 4, but most of the other summaries are based on the AOU.

The AOU lies within the area covered by Forest Resources Inventory (FRI), and very detailed summaries that include forest unit and age class area are presented. In southern Ontario, very old non-digital inventories are the only available FRI information. In the Northern Boreal only partial FRI coverage is available, so summaries of these areas rely heavily on the use of satellite imagery. Information sources are listed with each table throughout the document.

Figure 4.2 - Ontario's Managment Zones



4.3 - Ownerships

Most of the land in Ontario is owned by the people of Ontario, in the form of Crown and Park land and water. Approximately 13% of the land in Ontario is held in other types of ownerships. These different ownership classes tend to be concentrated in southern and central Ontario, but they do exist through to the northern tip of the province. The ownership classes outlined in this set of profiles include:

- Private or patented lands
- First Nations lands
- Federal lands (other than national parks)
- Protected areas

4.4 – Administrative Regions

The Ontario Ministry of Natural Resources (MNR) currently has three main administrative regions, each with a regional office and many district offices. Most of the MNR's information collection flows through a district then regional office before making its way to the Forest Management Branch to be used in this report. MNR's regions are:

- Northwest (Thunder Bay)
- Northeast (Timmins)
- Southern (Peterborough)

Figure 4.4 - Administrative Regions

4.5 - Ecological Land Classification

Ecological Land Classification (ELC) systems have been used for over 50 years in Ontario. This hierarchical system is useful for describing, planning, and managing natural areas. The upper levels in Ontario's ELC hierarchy are most useful for provincial and regional roll-ups of data and for strategic planning. The lower levels of the hierarchy are most useful for more detailed resource management purposes.

The system devised by Hills (1959) contained two higher-order categories, site regions and site districts. Site regions were characterized by broad climatic patterns, primarily temperature and precipitation. Site districts, which were nested within site regions, were characterized by physiographic similarities, and by the successional trends exhibited by the predominant vegetation types on those physiographic features.

In recent years, this system was revised to take account of new information and new technology, while maintaining Hills' original concepts (Crins and Uhlig, 2000). The revised site regions are now termed ecoregions, and the revised site districts are now termed ecodistricts. This mapping was further revised in 2003.

Ontario's three broad ecozones are subdivided into 14 ecoregions, which are further subdivided into 71 ecodistricts. This report focuses on the level of Ontario's 14 ecoregions.

4.1.1 – Forest Regions: The Hudson Bay Lowlands

The Hudson Bay lowlands are a large low-relief expanse of wetland. They are Canada's largest wetland, and are the third largest wetland in the world. Although much of this forest region falls within Ontario, it also extends into Manitoba. Within Ontario, it covers an area of 26 million hectares (one quarter of the province), is dominated by both treed and open muskeg (over two-thirds of its area), and is dotted with thousands of small lakes and ponds. The area contains bogs and fens (which are also referred to as muskeg). Bogs and fens contain a water absorbent peat based soil made up of dead decomposing plants, muck and sphagnum moss.

Productive forest cover is less than 25%, and is comprised of stunted tamarack (larch) and black spruce growing along riverbanks and other well-drained areas. White birch, dwarf birch and willow are the common deciduous trees in this forest region. Satellite information shows nearly half of this forest is in the "sparse" class, with a very low density of tree coverage. As this region transitions into the boreal forest further south, trees become larger, and jack pine, poplar and other common boreal trees begin to occur with more frequency.

The Hudson Bay lowlands are greatly affected by the cold northern climate, and contain all of Ontario's tundra (284,000 ha). The region also contains Ontario's largest park, Polar Bear Provincial Park, at 2.3 million hectares.

Some forest ecologists consider the Hudson Bay Lowlands a sub-zone of the boreal forest, called the boreal barrens. This classification extends across Canada from the Yukon through to Newfoundland, and is found just north of the Boreal forest.

The Hudson Bay lowlands support a great variety of birds and animals, such as polar bears, caribou, arctic foxes and other animals normally associated with Arctic habitats. Some common birds found in this region include Canada geese, willow ptarmigan and various species of sea ducks.

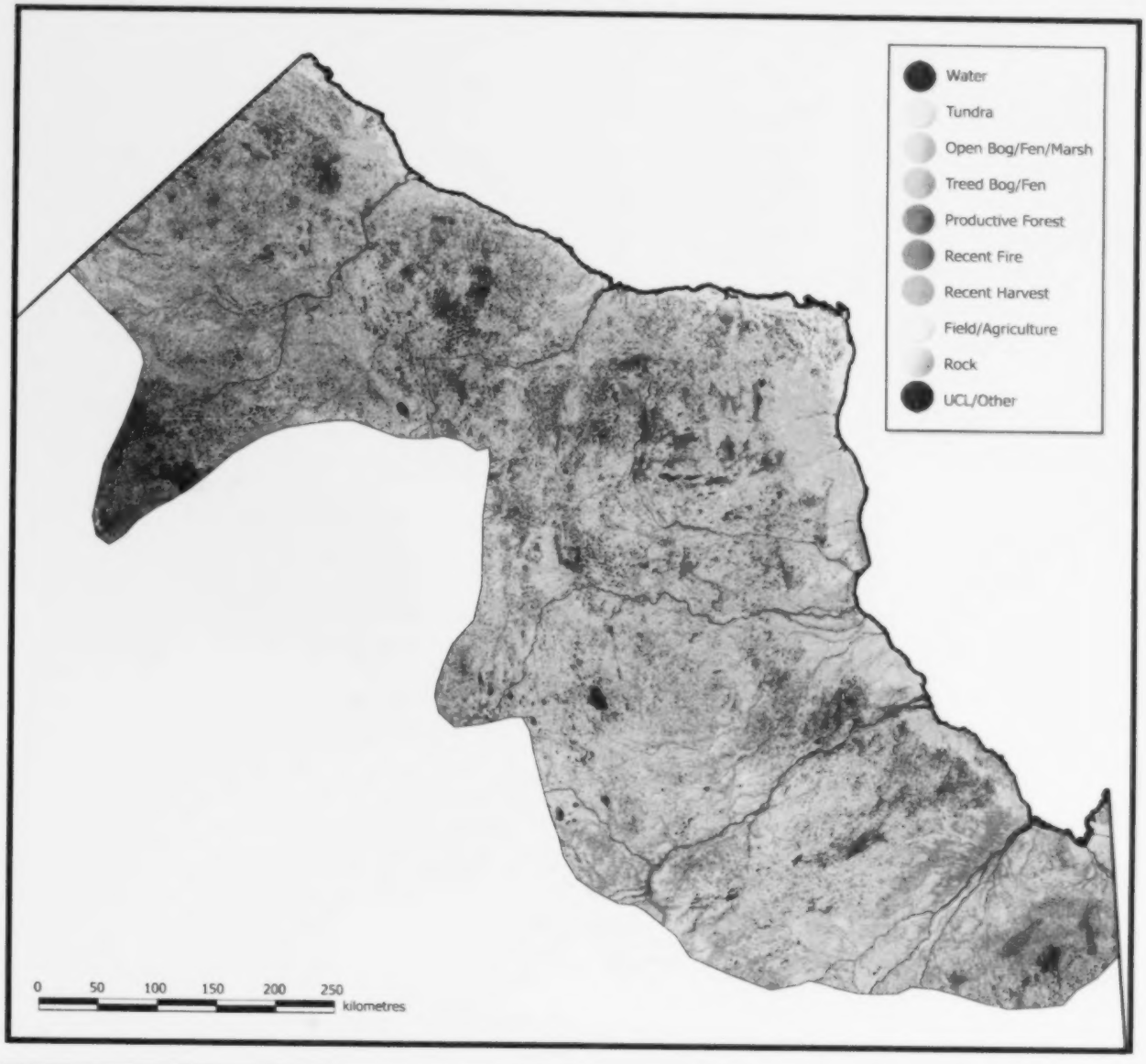
Only a very small portion of the AOU actually falls on the Hudson Bay lowlands, in an area of boreal-transitional forest at the northern end of the Cochrane-Moose River management unit. The total overlap area is approximately 430,000 hectares. The forest within this area is highlighted in the summary 4.1.2.

Hudson Bay Lowlands - Bog/Fen landscape

4.1.1 - Geographic Profile - Map

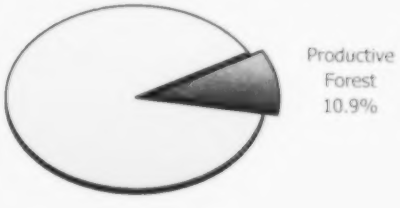
Forest Regions - Hudson's Bay Lowlands

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

Profile Forest as Proportion of Ontario's Forest

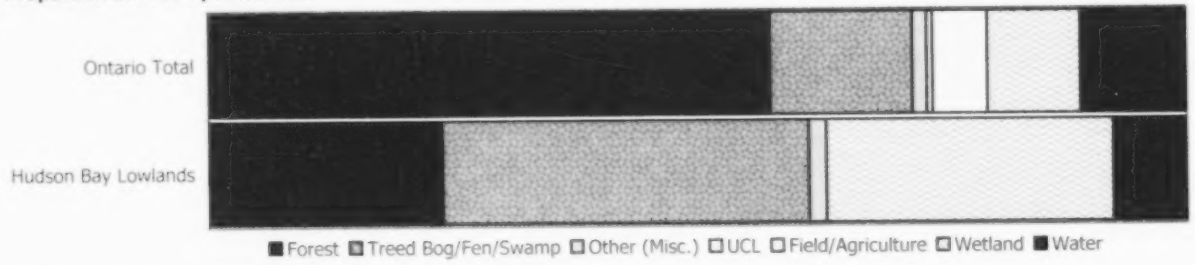


4.1.1 - Geographic Profile - Satellite Data — Forest Regions - Hudson Bay Lowlands

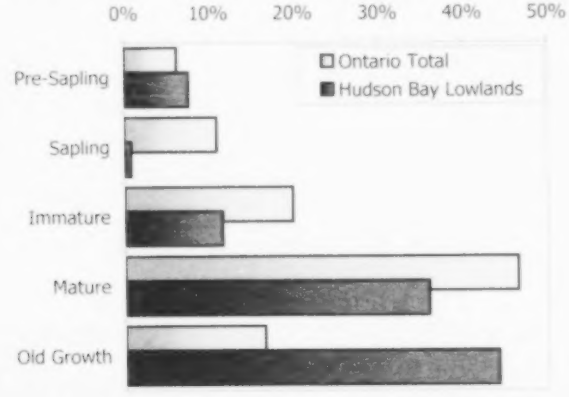
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	7.1	1,673.3	1,680.4	252.7	0.0	1,933.1	7.5%
Wetland	33.5	6,565.1	6,598.5	957.6	8.3	7,564.4	29.3%
Rock	0.2	37.9	38.1	16.8	0.1	55.0	0.2%
Field/Agriculture	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
UCL	0.1	1.0	1.0	0.0	0.8	1.9	0.0%
Other (Misc.)	0.0	143.1	143.1	256.0	0.9	400.0	1.5%
Other (Unknown/Cloud)	0.0	0.2	0.2	0.1	0.0	0.2	0.0%
Subtotal:	40.8	8,420.5	8,461.4	1,483.1	10.1	9,954.6	38.6%
Non-productive Forest							
Swamp	0.0	0.1	0.1	0.0	0.0	0.1	0.0%
Treed Bog & Fen	107.2	8,716.0	8,823.2	824.9	32.0	9,680.1	37.5%
Subtotal:	107.2	8,716.1	8,823.3	824.9	32.0	9,680.2	37.5%
Productive Forest							
Dense Deciduous	0.0	42.0	42.0	3.3	2.2	47.5	0.2%
Dense Conifer	147.5	1,698.7	1,846.1	104.4	15.6	1,966.1	7.6%
Mixed Forest	20.5	578.4	598.9	37.7	4.2	640.7	2.5%
Sparse Forest	35.9	2,665.8	2,701.6	113.6	9.2	2,824.4	10.9%
Disturbance - Harvest	2.0	0.0	2.0	0.0	0.0	2.0	0.0%
Disturbance - Fire	11.1	396.1	407.2	68.2	1.9	477.4	1.8%
Regenerating Forest	0.0	210.6	210.6	6.3	3.8	220.8	0.9%
Subtotal:	217.0	5,591.6	5,808.5	333.5	36.9	6,178.9	23.9%
All Forest:	324.2	14,307.7	14,631.8	1,158.5	68.9	15,859.2	61.4%
Forest Proportion:	2.0%	90.2%	92.3%	7.3%	0.4%	100.0%	
Grand Total:	365.0	22,728.2	23,093.2	2,641.6	79.0	25,813.8	100.0%
Total Proportion:	1.4%	88.0%	89.5%	10.2%	0.3%	100.0%	

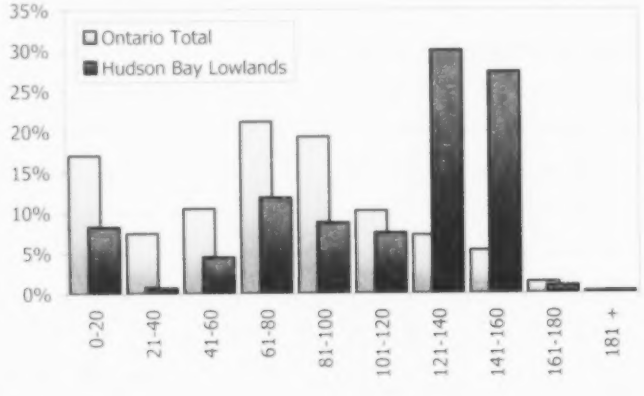
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	0.0	0.5	0.4	22.7	0.0	0.0	0.0	0.0	23.6
21-40	0.0	0.0	0.5	1.3	0.1	0.1	0.0	0.0	2.0
41-60	0.0	1.0	4.3	6.8	0.7	0.1	0.0	0.0	12.9
61-80	0.0	1.5	7.3	23.5	1.2	0.5	0.0	0.0	33.9
81-100	0.0	0.5	4.9	18.0	0.9	0.6	0.0	0.0	25.0
101-120	0.0	0.7	3.3	17.1	0.3	0.0	0.0	0.0	21.4
121-140	0.0	0.0	4.5	81.0	0.2	0.0	0.0	0.0	85.7
141-160	0.0	0.0	4.3	73.7	0.1	0.0	0.0	0.0	78.1
161-180	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	2.8
181 +	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.8
Total:	0.0	4.1	29.4	247.6	3.6	1.3	0.1	0.0	286.2

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	0.0	0.0	0.1	21.6	0.0	0.0	0.0	0.0	21.7
Sapling	0.0	0.4	0.3	1.4	0.0	0.0	0.0	0.0	2.2
Immature	0.0	1.3	5.0	25.7	0.8	0.2	0.0	0.0	33.0
Mature	0.0	1.8	12.1	85.6	2.2	1.1	0.1	0.0	102.9
Old Growth	0.0	0.6	11.9	113.2	0.5	0.0	0.0	0.0	126.4
Total:	0.0	4.1	29.4	247.6	3.6	1.3	0.1	0.0	286.2

Proportion of Profile Area within AOU (all ownerships)

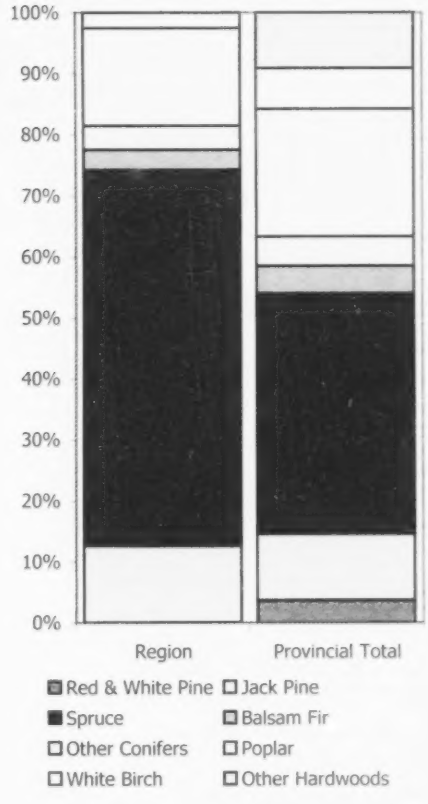
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	286.2	4.6%	286.2	4.6%
Total Area:	436.0	2.7%	436.0	2.7%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	0.0	0.0	0.0	0.0
Red Pine	0.0	0.0	0.0	0.0
Jack Pine	51,570.4	35,261.6	458.1	821.2
Black Spruce	249,424.1	145,116.1	1,820.2	2,408.1
White Spruce	4,118.3	2,591.4	51.9	51.6
Balsam Fir	13,688.0	4,752.6	207.8	188.3
Cedar	5,667.7	1,624.7	33.9	47.5
Larch	10,470.8	3,368.4	70.7	95.0
Hemlock	0.0	0.0	0.0	0.0
Other Conifers	0.0	0.0	0.0	0.0
Poplar	65,747.0	39,465.9	519.0	840.7
White Birch	10,548.3	6,095.3	78.6	140.3
Hard Maple	0.0	0.0	0.0	0.0
Yellow Birch	0.0	0.0	0.0	0.0
Ash	106.8	74.7	1.5	1.4
Oak	0.0	0.0	0.0	0.0
Other Hardwoods	0.0	0.0	0.0	0.0
Total	411,341.3	238,350.6	3,241.7	4,594.2
Proportion of Ontario:	5.7%	5.5%	5.2%	5.3%

Proportion of Volume by Species



4.1.2: Forest Regions - The Boreal Forest

The boreal forest is a worldwide band of conifer-dominated forest that stretches across Scandinavia, Russia, Alaska and northern Canada. It is estimated that the boreal forests of the world cover 1.7 billion hectares. Within Canada, the grouping of boreal forest regions covers over 575 million hectares. The zone which most closely reflects the boreal forest found in Ontario (called the boreal shield) covers 180 million hectares, stretching from northern Alberta through to southern Labrador. Ontario's portion of this boreal shield region extends from the northern limits of the Great Lakes-St. Lawrence Forest to the Hudson Bay Lowlands. With an area of 50 million hectares, this forest region is by far the province's largest, and contains two thirds of Ontario's forest.

Boreal tree species are associated with particular soil types and terrain conditions. For example, black spruce and larch (tamarack) are often associated with poorly drained areas, while trembling aspen (poplar), white spruce; white birch and jack pine grow on well-drained upland or rocky sites. The boreal softwoods (jack pine, black spruce, white spruce, and balsam fir) and intolerant hardwoods (trembling aspen, white birch, and balsam poplar) are generally even-aged in character. Black spruce makes up half of all tree species in the boreal forest by growing stock volume, with jack pine and poplar making up another third.

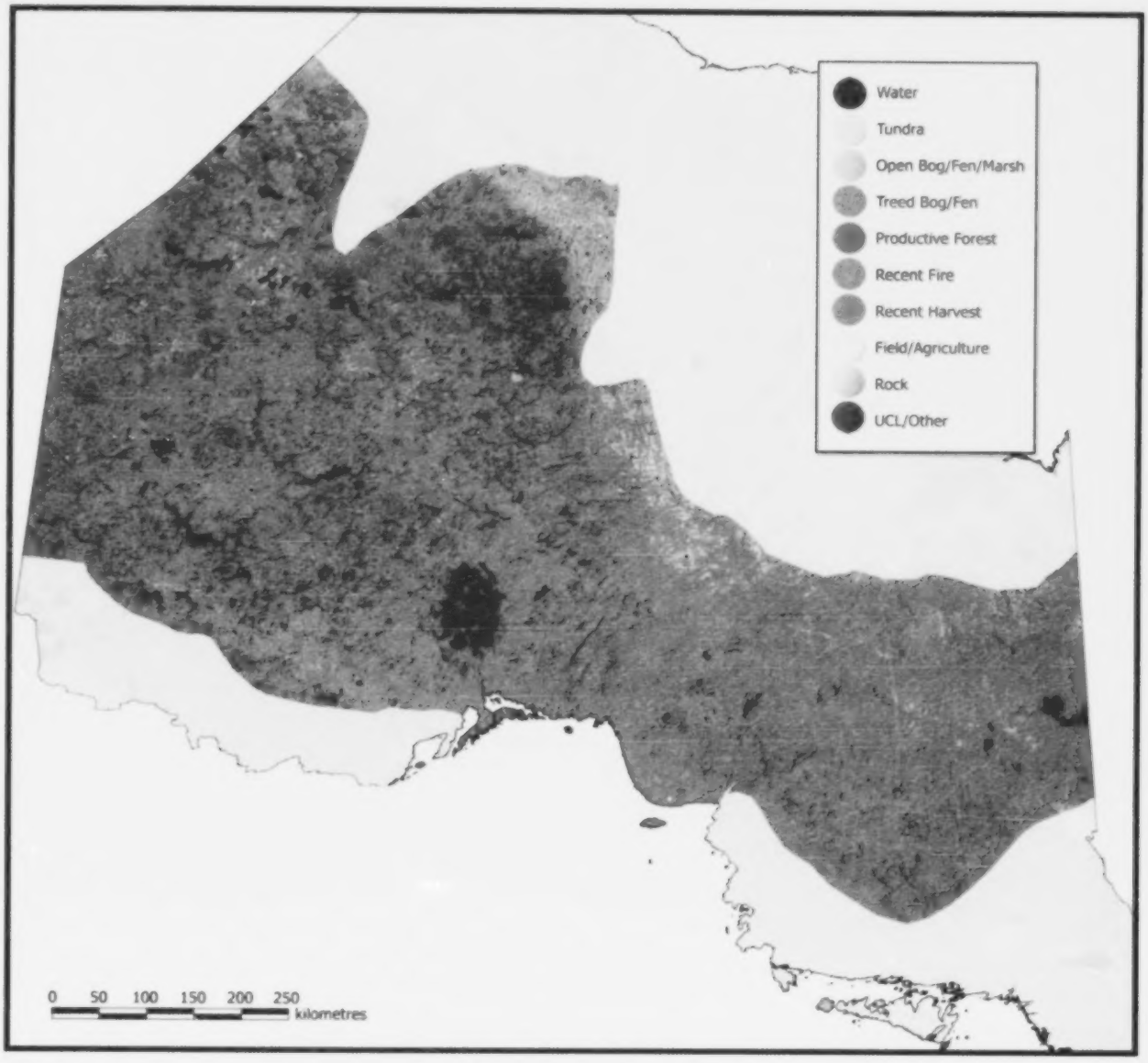
Boreal forests are characterized by natural disturbance, and are heavily influenced by the size, intensity and frequency of fires that have burned across the landscape. In recent years, wildfires have impacted hundreds of thousands of hectares annually. Weather also affects forest conditions by blowing down large swaths of trees, or causing snow and ice damage. Forest insects such as the spruce budworm or forest tent caterpillar can defoliate immense areas of forest.

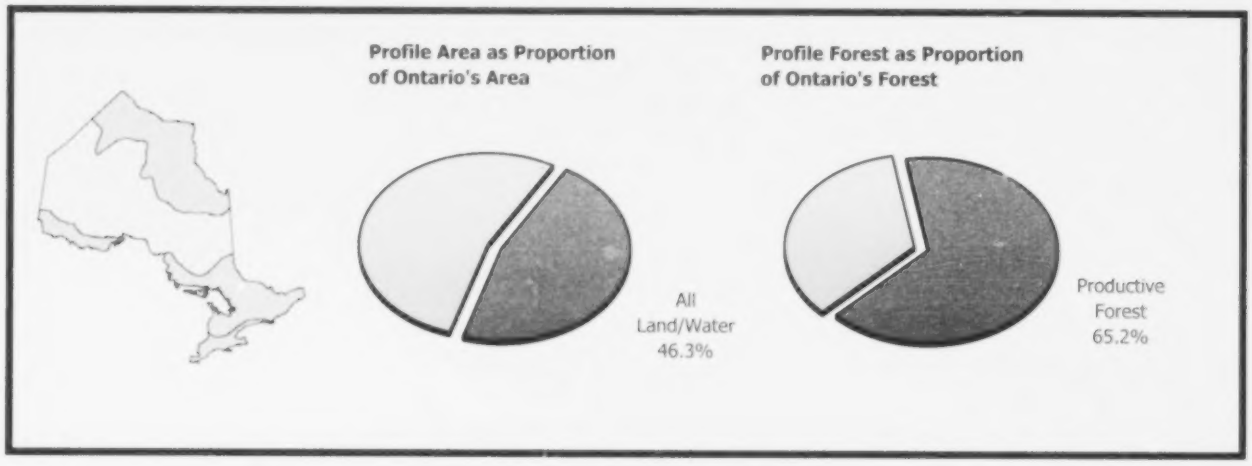
The boreal forest supports a wide variety of wildlife, which includes predators such as black bears, wolves and lynx; large ungulates like moose and caribou; a myriad of birds ranging from the great gray owl to the tiny winter wren, and many small mammals such as the pine marten, varying hare, red fox and porcupine.

During the last 80 years, man's activities have affected the boreal forest. Timber harvesting has affected the species mix and arrangement of the forest, and forest fire suppression has made the forest much older than would occur naturally. This shift in age class structure is expected to balance out over the next few decades, especially if global warming causes an increase in forest fires.

Boreal Forest - Black Spruce and Sphagnum Moss

2002 Satellite Imagery



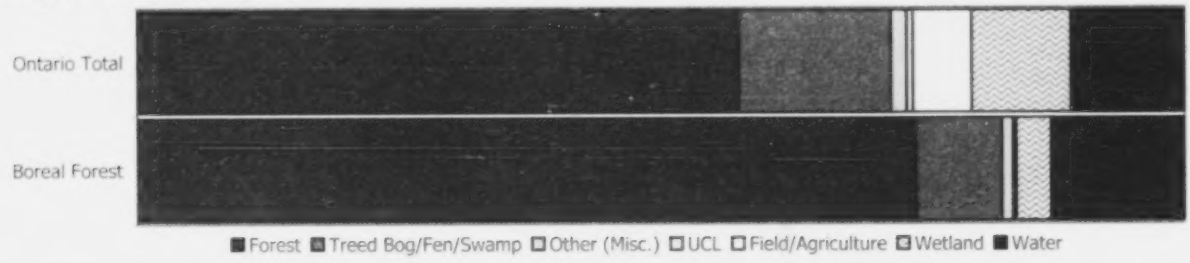

Profile Area as Proportion of Ontario's Area
All Land/Water 46.3%
Profile Forest as Proportion of Ontario's Forest
Productive Forest 65.2%

4.1.2 - Geographic Profile - Satellite Data — Forest Regions - Boreal Forest

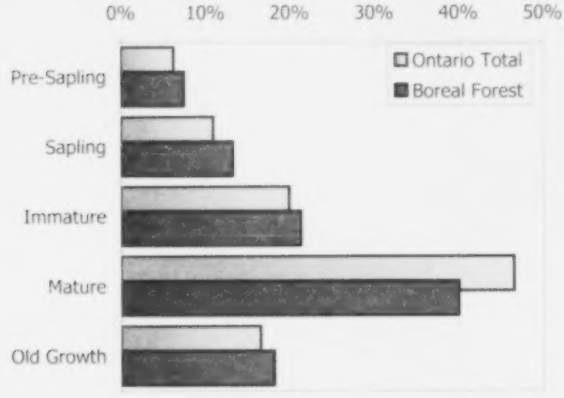
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	3,140.0	2,254.2	5,394.2	942.4	0.0	6,336.6	12.7%
Wetland	212.7	1,334.8	1,547.4	93.5	14.9	1,655.8	3.3%
Rock	35.1	100.2	135.3	20.6	14.9	170.8	0.3%
Field/Agriculture	3.8	0.0	3.8	0.0	61.5	65.4	0.1%
UCL	21.5	8.8	30.2	0.8	53.5	84.5	0.2%
Other (Misc.)	31.8	152.4	184.2	29.1	2.7	216.0	0.4%
Other (Unknown/Cloud)	34.5	71.2	105.7	36.4	3.3	145.5	0.3%
Subtotal:	3,479.3	3,921.6	7,400.9	1,122.8	150.8	8,674.6	17.4%
Non-productive Forest							
Swamp	0.0	0.4	0.4	0.0	0.0	0.5	0.0%
Treed Bog & Fen	1,065.7	2,702.2	3,767.9	246.8	73.6	4,088.2	8.2%
Subtotal:	1,065.7	2,702.6	3,768.3	246.8	73.6	4,088.7	8.2%
Productive Forest							
Dense Deciduous	1,625.6	247.0	1,872.6	238.8	163.0	2,274.4	4.6%
Dense Conifer	6,354.3	4,108.4	10,462.7	1,038.8	337.8	11,839.3	23.8%
Mixed Forest	6,642.3	1,567.9	8,210.1	830.8	646.8	9,687.7	19.4%
Sparse Forest	3,500.9	4,159.3	7,660.2	733.1	281.0	8,674.3	17.4%
Disturbance - Harvest	1,818.9	1.1	1,820.0	29.2	111.0	1,960.2	3.9%
Disturbance - Fire	194.9	1,290.4	1,485.2	163.6	7.8	1,656.6	3.3%
Regenerating Forest	23.2	863.3	886.5	92.7	10.9	990.0	2.0%
Subtotal:	20,159.9	12,237.4	32,397.3	3,127.0	1,558.2	37,082.5	74.4%
All Forest:	21,225.6	14,940.0	36,165.6	3,373.8	1,631.8	41,171.2	82.6%
Forest Proportion:	51.6%	36.3%	87.8%	8.2%	4.0%	100.0%	
Grand Total:	24,704.9	18,861.6	43,566.5	4,496.6	1,782.7	49,845.8	100.0%
Total Proportion:	49.6%	37.8%	87.4%	9.0%	3.6%	100.0%	

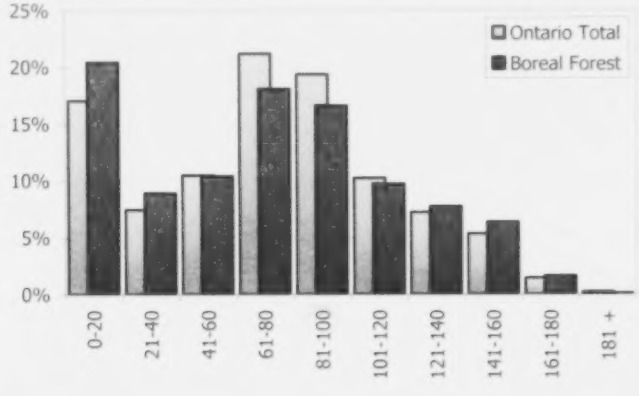
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



4.1.2 - Geographic Profile - Inventory Data — Forest Regions - Boreal Forest

Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	9.6	811.1	1,183.7	1,454.6	473.0	529.5	141.0	3.3	4,605.8
21-40	1.3	392.0	539.1	273.9	550.1	206.8	44.8	0.7	2,008.7
41-60	3.6	203.4	641.0	333.8	679.5	282.4	197.6	6.8	2,348.1
61-80	4.0	328.4	1,175.8	596.4	1,021.9	565.2	358.0	26.0	4,075.7
81-100	7.7	236.7	1,170.2	747.9	825.2	470.2	259.1	25.0	3,742.0
101-120	6.6	55.7	624.3	798.0	371.5	220.7	99.7	12.5	2,189.0
121-140	8.5	30.7	414.6	1,074.0	137.7	49.1	22.2	5.8	1,742.6
141-160	7.8	7.6	326.3	1,001.5	74.2	8.0	5.5	1.6	1,432.4
161-180	5.4	0.6	102.4	255.0	5.2	0.3	0.0	0.8	369.5
181 +	2.3	0.1	7.9	10.4	2.7	0.1	0.0	0.1	23.6
Total:	56.9	2,066.2	6,185.4	6,545.4	4,141.0	2,332.1	1,127.9	82.5	22,537.5

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	6.2	228.9	363.5	731.1	129.6	169.7	49.6	2.6	1,681.1
Sapling	3.5	582.2	820.2	917.1	343.5	244.5	69.9	0.7	2,981.6
Immature	7.4	651.7	1,399.2	805.9	1,229.6	508.2	179.7	14.3	4,796.0
Mature	26.2	531.6	2,310.8	2,413.3	1,971.5	1,038.5	653.0	55.7	9,000.6
Old Growth	13.6	71.9	1,291.7	1,678.0	466.9	371.3	175.8	9.2	4,078.2
Total:	56.9	2,066.2	6,185.4	6,545.4	4,141.0	2,332.1	1,127.9	82.5	22,537.5

Proportion of Profile Area within AOU (all ownerships)

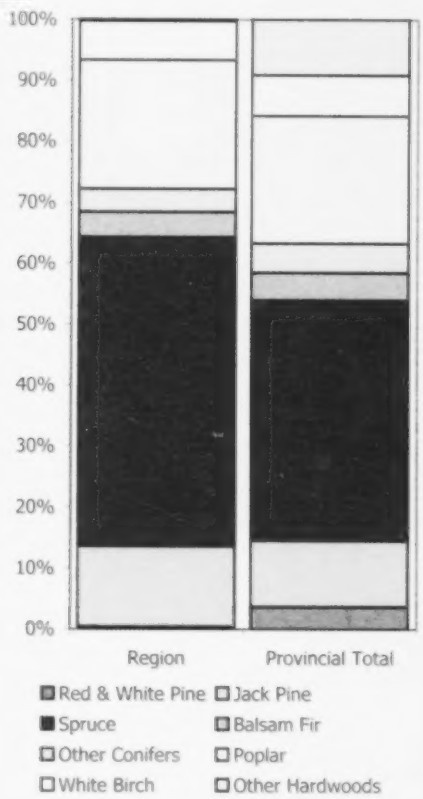
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	23,569.8	63.6%	22,537.5	60.8%
Total Area:	29,132.7	58.4%	27,698.1	55.6%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	13,055.3	8,641.6	108.8	140.0
Red Pine	3,945.2	2,890.6	30.3	54.5
Jack Pine	625,396.3	426,835.3	5,726.2	10,335.4
Black Spruce	2,320,677.1	1,353,991.8	18,825.7	23,519.0
White Spruce	76,739.2	46,144.5	999.0	968.5
Balsam Fir	195,716.3	71,833.5	2,952.7	2,682.3
Cedar	91,318.4	28,141.3	619.2	826.7
Larch	86,631.4	28,337.8	643.5	817.0
Hemlock	82.6	58.4	0.7	0.8
Other Conifers	17.1	4.1	0.2	0.3
Poplar	1,000,949.9	611,231.0	8,676.8	13,530.3
White Birch	302,883.4	178,789.2	2,088.4	4,085.2
Hard Maple	3,459.2	2,167.1	35.5	38.8
Yellow Birch	2,215.8	1,638.5	19.9	23.3
Ash	1,643.0	1,111.2	22.5	21.1
Oak	63.3	45.9	0.7	0.7
Other Hardwoods	6,163.1	4,283.2	79.9	77.6
Total	4,730,956.6	2,766,145.0	40,830.3	57,121.5
Proportion of Ontario:	**65.5%**	**64.2%**	**64.8%**	**65.6%**

Proportion of Volume by Species



4.1.3 – Forest Regions: The Great Lakes – St. Lawrence Forest

The Great Lakes - St. Lawrence Forest Region is a hardwood/ mixedwood dominated zone that extends inland from the edges of the Lake Superior in the north through to the St. Lawrence River in southeastern Ontario. This region covers approximately 20 million hectares of Ontario, two-thirds of which is productive forest. The Great Lakes-St. Lawrence region also contains about 25% of Ontario's actively managed Crown forests.

The greatest concentrations of Great Lakes-St. Lawrence forests occur on the north shore of Lake Huron and in the Algonquin Park area. and the Great Lakes - Boreal transitional zone that stretches from Thunder Bay to Fort Frances in northwestern Ontario. Forests grow on a variety of soil types, ranging from shallow soil over granite bedrock, to deep soils or limestone based rocky soils in the Bruce Peninsula area.

The northern transitional portion of the Great Lakes – St. Lawrence forest is dominated by sugar maple, white pine, poplar, spruce and yellow birch. The central and southern portions of this region have additional common species such as red pine, red maple, eastern white cedar, hemlock, oak, cherry, beech and basswood. Tolerant hardwoods, red and white pine and mixedwood stands make up approximately half of the forest in this region.

The great diversity of habitat in the Great Lakes – St. Lawrence forest region supports many wildlife species. White-tailed deer, pileated woodpecker, raccoon and ruffed grouse are common in this forest region, as well as several species of reptiles and amphibians not found in the north. Moose, bear and other boreal species may also be found here. Bird species reflect those that prefer a milder climate, and many raptors and songbirds found in this region become uncommon north of the French River.

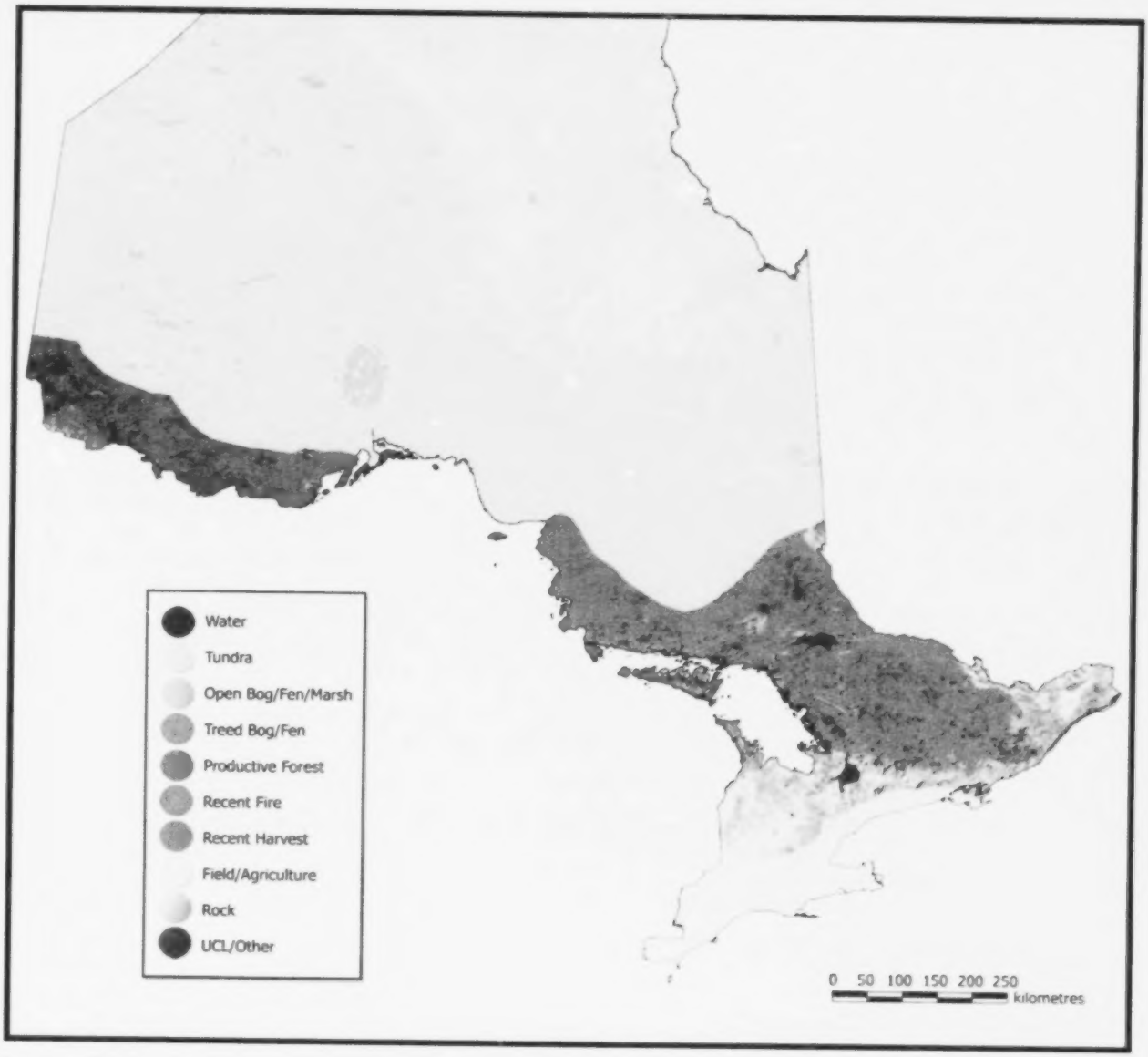
Much of the forest in the Great-Lakes St. Lawrence forest is uneven aged, meaning that young and old trees can be found within the same group of trees. This makes for a very different forest from the boreal, which is mostly even aged. The southern portion of the Great-Lakes St. Lawrence forest extends into the populated areas of Ontario, where productive forest cover drops from 75% within the AOU, to 30% south of the AOU. A much larger portion of the forest in this region is privately owned (38%) when compared to the boreal forest (4%).

Great Lakes - St. Lawrence Forest - Sugar Maple Forest

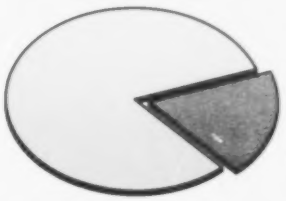
4.1.3 - Geographic Profile - Map

Forest Regions - Great Lakes St. Lawrence Forest

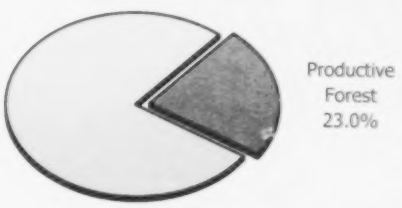
2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area



Profile Forest as Proportion of Ontario's Forest

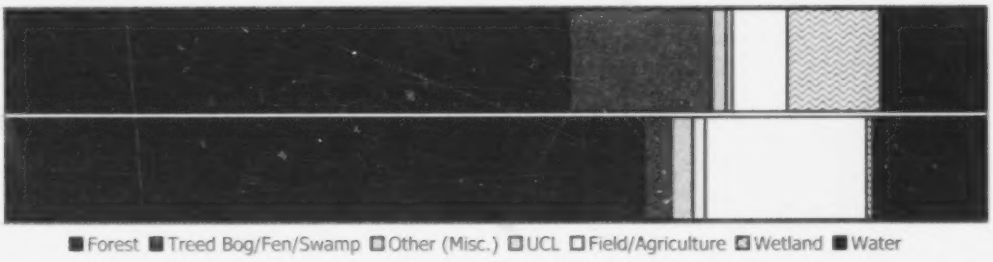


4.1.3 - Geographic Profile - Satellite Data — Forest Regions - Great Lakes St. Lawrence Forest

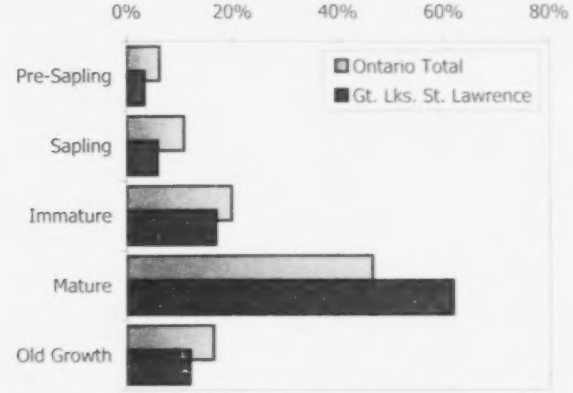
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	1,716.4	254.1	1,970.5	362.4	0.0	2,332.9	11.6%
Wetland	24.8	1.7	26.6	12.8	88.5	127.9	0.6%
Rock	68.7	16.1	84.8	67.2	158.5	310.5	1.5%
Field/Agriculture	12.3	2.7	15.0	3.6	3,276.8	3,295.4	16.4%
UCL	20.4	2.0	22.4	1.9	232.1	256.4	1.3%
Other (Misc.)	7.2	0.4	7.6	1.8	38.7	48.2	0.2%
Other (Unknown/Cloud)	38.2	0.3	38.5	13.7	33.2	85.3	0.4%
Subtotal:	1,888.0	277.4	2,165.4	463.4	3,827.8	6,456.6	32.1%
Non-productive Forest							
Swamp	0.0	0.4	0.4	1.3	111.6	113.4	0.6%
Treed Bog & Fen	164.3	0.6	164.9	42.3	251.9	459.1	2.3%
Subtotal:	164.3	1.0	165.3	43.6	363.6	572.5	2.8%
Productive Forest							
Dense Deciduous	1,317.2	2.8	1,319.9	280.3	1,500.6	3,100.9	15.4%
Dense Conifer	1,201.0	2.4	1,203.4	282.4	684.1	2,169.9	10.8%
Mixed Forest	2,800.3	7.8	2,808.1	665.3	1,888.7	5,362.1	26.7%
Sparse Forest	980.8	6.9	987.7	262.9	843.6	2,094.2	10.4%
Disturbance - Harvest	219.9	0.1	220.0	3.7	73.4	297.1	1.5%
Disturbance - Fire	1.1	0.1	1.3	4.9	27.5	33.6	0.2%
Regenerating Forest	0.0	0.1	0.1	0.1	30.6	30.8	0.2%
Subtotal:	6,520.4	20.1	6,540.5	1,499.6	5,048.5	13,088.6	65.1%
All Forest:	6,684.7	21.1	6,705.8	1,543.1	5,412.1	13,661.1	67.9%
Forest Proportion:	**48.9%**	**0.2%**	**49.1%**	**11.3%**	**39.6%**	**100.0%**	
Grand Total:	8,572.7	298.5	8,871.2	2,006.6	9,239.9	20,117.7	100.0%
Total Proportion:	**42.6%**	**1.5%**	**44.1%**	**10.0%**	**45.9%**	**100.0%**	

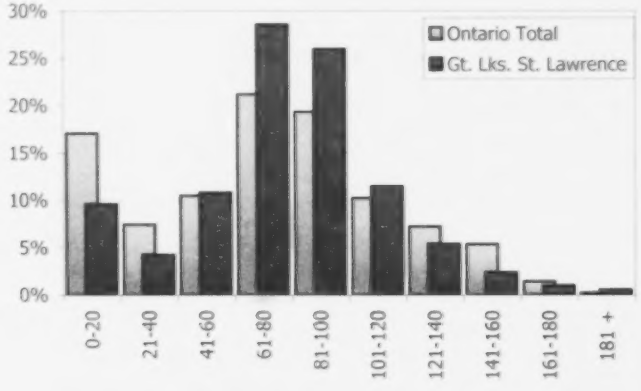
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	Tolerant White Birch	Tolerant Hardwood	Total
0-20	86.9	142.8	171.5	61.0	132.9	226.1	73.6	52.2	947.1
21-40	52.4	51.0	61.3	4.4	111.0	77.6	32.5	29.0	419.3
41-60	74.2	35.8	211.2	19.1	229.8	146.4	241.6	105.9	1,064.0
61-80	166.3	92.4	466.7	68.9	538.2	475.2	537.6	471.0	2,816.3
81-100	309.0	71.2	436.3	114.1	327.5	208.0	263.2	829.3	2,558.6
101-120	271.4	14.7	194.8	58.7	91.2	34.0	54.0	412.8	1,131.5
121-140	95.6	3.5	94.5	36.9	23.8	3.5	13.1	261.2	531.9
141-160	29.0	0.2	36.9	23.1	5.3	0.3	2.3	139.0	236.1
161-180	10.1	0.0	15.5	4.9	1.8	0.1	1.4	66.2	99.9
181 +	6.6	0.0	28.0	0.2	0.5	0.0	0.3	17.2	52.7
Total:	1,101.4	411.7	1,716.5	391.3	1,462.0	1,171.2	1,219.7	2,383.9	9,857.6

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	Tolerant White Birch	Tolerant Hardwood	Total
Pre-Sapling	49.8	28.2	47.4	40.0	43.8	55.9	29.6	37.7	332.6
Sapling	37.1	114.6	124.0	24.0	89.1	134.8	36.1	19.0	578.7
Immature	236.7	103.4	364.8	66.2	340.8	190.1	170.0	196.6	1,668.7
Mature	741.4	154.1	886.5	227.6	903.3	730.6	880.0	1,569.1	6,092.6
Old Growth	36.4	11.3	293.7	33.5	84.9	59.7	104.0	561.5	1,185.1
Total:	1,101.4	411.7	1,716.5	391.3	1,462.0	1,171.2	1,219.7	2,383.9	9,857.6

Proportion of Profile Area within AOU (all ownerships)

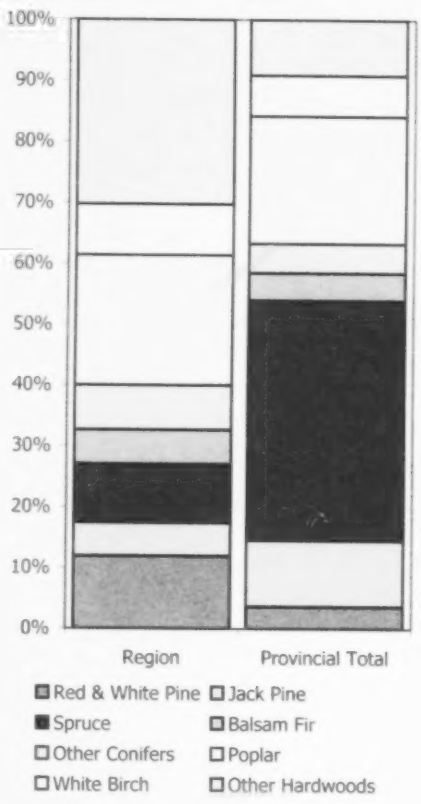
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	10,983.1	83.9%	9,857.6	75.3%
Total Area:	14,240.8	70.8%	14,225.9	70.7%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	189,541.3	125,098.9	1,666.0	2,143.0
Red Pine	47,210.2	34,814.0	453.5	685.0
Jack Pine	107,917.0	78,047.3	863.0	1,693.0
Black Spruce	129,395.5	71,505.7	1,469.4	1,539.7
White Spruce	61,323.6	36,166.1	740.4	755.0
Balsam Fir	112,643.8	45,301.3	1,413.1	1,428.2
Cedar	83,233.6	29,297.7	719.9	888.1
Larch	11,333.6	4,358.6	107.8	127.9
Hemlock	49,868.9	34,406.4	339.3	456.1
Other Conifers	548.7	151.6	15.4	10.9
Poplar	424,623.7	276,181.2	3,511.8	5,797.6
White Birch	165,519.1	99,863.4	984.1	2,206.3
Hard Maple	297,408.6	189,167.3	2,607.3	3,067.5
Yellow Birch	64,386.3	48,074.4	456.2	602.7
Ash	26,877.9	18,721.6	337.7	332.8
Oak	64,207.8	47,363.3	672.6	725.0
Other Hardwoods	148,791.8	105,695.0	1,698.0	1,750.5
Total	1,984,831.4	1,244,213.7	18,055.6	24,209.1
Proportion of Ontario:	**27.5%**	**28.9%**	**28.7%**	**27.8%**

Proportion of Volume by Species



4.1.4 – Forest Regions: The Deciduous Forest

A small portion of the Deciduous Forest Region, which is widespread in the eastern United States, extends into southwestern Ontario. Occurring primarily in pockets of forest on private land, and within provincial parks on the north shore of Lake Erie, the Deciduous or Carolinian forest region exists in the most densely populated area of Ontario. Although it covers less than 1% of Canada's land mass, the region is now home to more than 25% of Canada's population.

Although this forest region covers over 3 million hectares, only about 17% is forest. More than 70% of this region is agricultural land, while most of the remaining area is urban or water. Forests are now mostly restricted to areas with low agricultural potential, such as sand plains and bottomlands. Much of the forest in this region consists of small woodlots adjacent to farmland. These forest fragments have been greatly modified by human activities. Good examples of the deciduous forest region exist on Lake Erie's northern shore, in parks such as Wheatley, Rondeau, and Turkey Point.

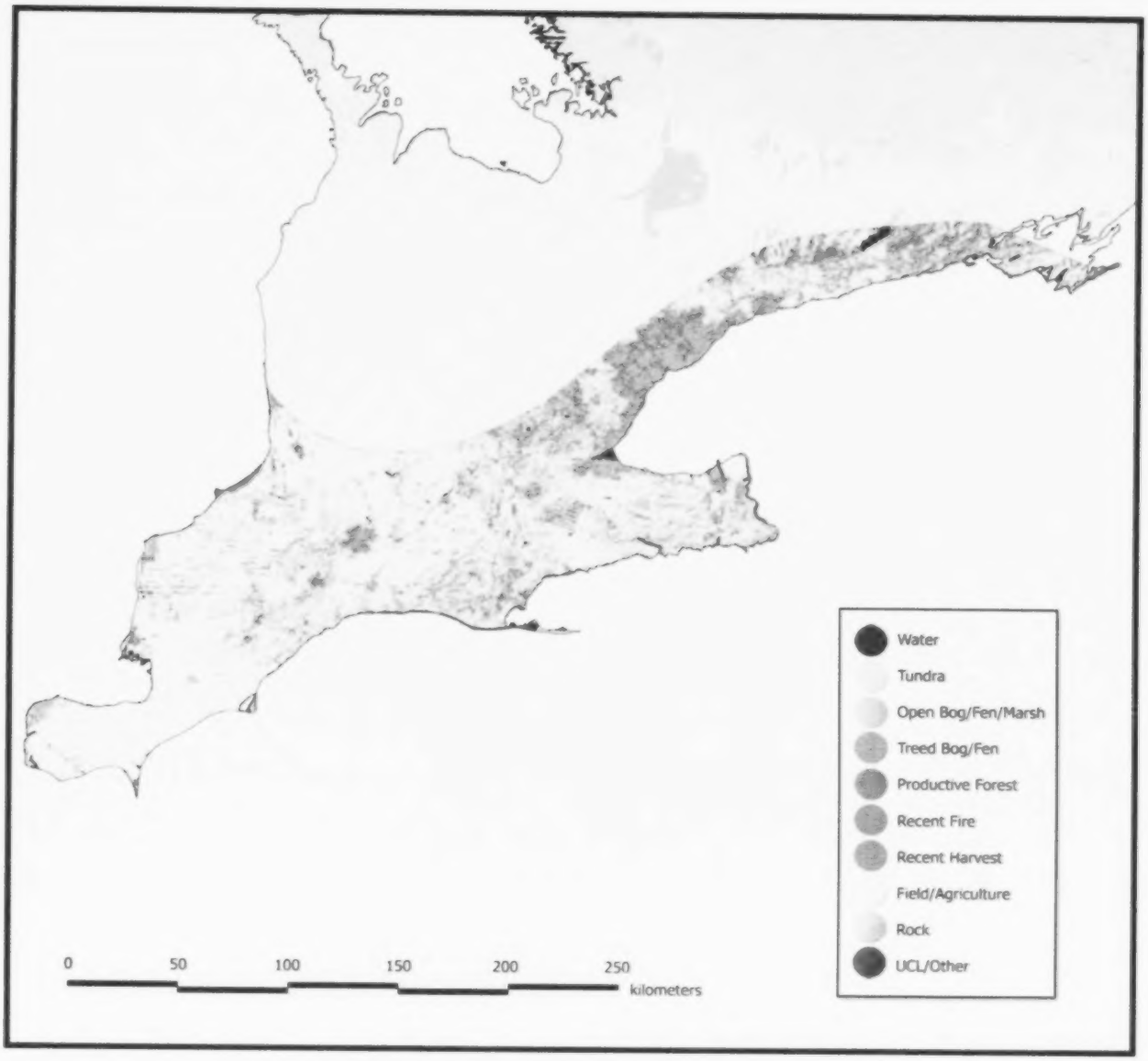
Soils ranging from gravel to clay cover the limestone that underlies this region. Most hardwoods growing in the Great Lakes-St. Lawrence region can be found here, with other tree species such as the sassafras, walnut, tulip tree, white elm, hickory, and several varieties of oaks.

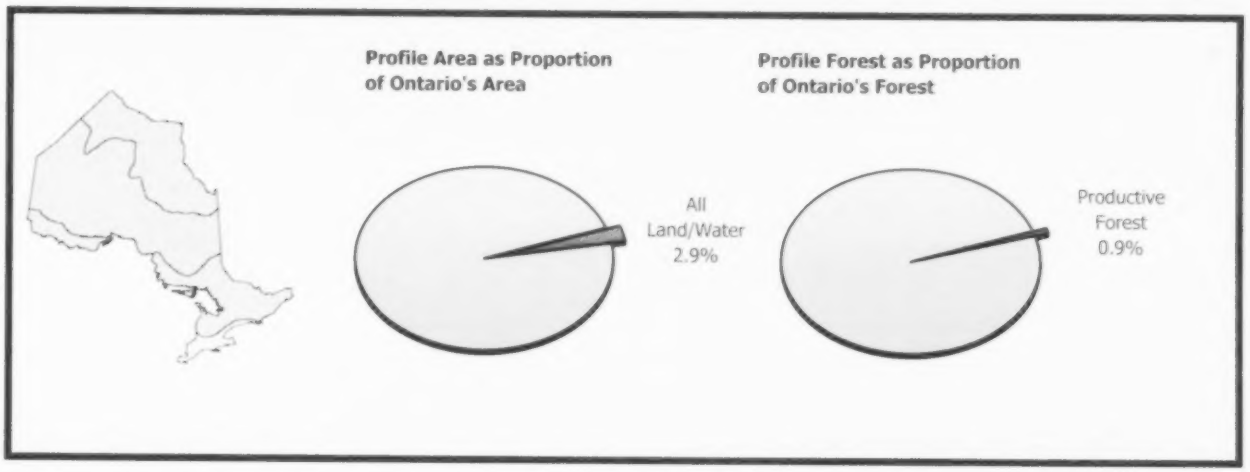
The Deciduous Forest generally has the greatest diversity of tree species, while at the same time having the lowest proportion of forest. There are many types of forest plants found in this region that are not found anywhere else in Canada.

With its rich forests and warm climate, several unique wildlife species such as opossum, southern flying squirrel, prothonatary warbler and red-bellied woodpecker occur in the Deciduous Forest. Many species of reptiles and amphibians can also be found in this region, such as the black rat snake, milk snake and gray tree frog.

Deciduous Forest - Beech, Oak and Maple Forest

2002 Satellite Imagery



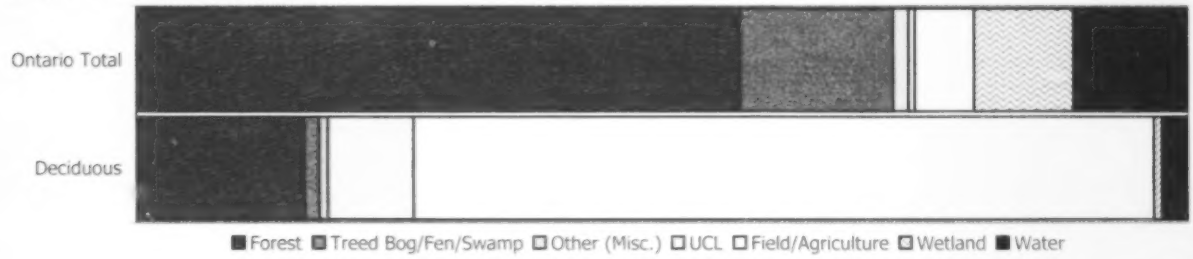

Profile Area as Proportion of Ontario's Area
All Land/Water 2.9%
Profile Forest as Proportion of Ontario's Forest
Productive Forest 0.9%

4.1.4 - Geographic Profile - Satellite Data — Forest Regions - Deciduous Forest

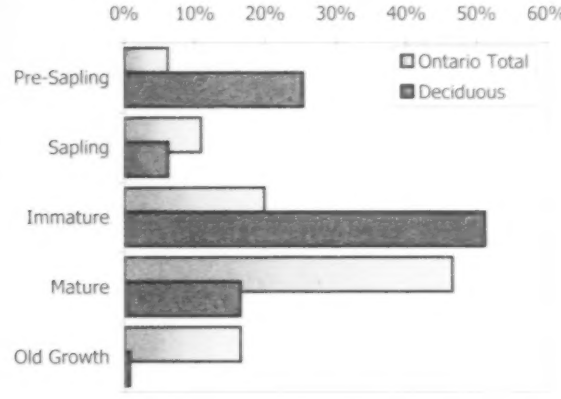
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	0.0	72.8	72.9	1.7	0.0	74.6	2.4%
Wetland	0.0	3.2	3.2	1.7	19.2	24.0	0.8%
Rock	0.0	0.4	0.4	0.4	9.8	10.6	0.3%
Field/Agriculture	0.0	8.7	8.7	1.9	2,163.0	2,173.6	70.3%
UCL	0.0	2.8	2.8	0.1	250.3	253.3	8.2%
Other (Misc.)	0.0	0.2	0.2	0.1	6.5	6.9	0.2%
Other (Unknown/Cloud)	0.0	0.5	0.5	0.1	8.2	8.7	0.3%
Subtotal:	0.0	88.6	88.6	6.2	2,456.9	2,551.7	82.6%
Non-productive Forest							
Swamp	0.0	0.2	0.2	0.5	6.7	7.4	0.2%
Treed Bog & Fen	0.0	1.0	1.0	0.4	34.3	35.7	1.2%
Subtotal:	0.0	1.2	1.2	0.8	41.0	43.1	1.4%
Productive Forest							
Dense Deciduous	0.0	0.6	0.6	2.5	246.2	249.3	8.1%
Dense Conifer	0.0	1.4	1.4	1.0	32.4	34.8	1.1%
Mixed Forest	0.0	0.4	0.4	0.9	117.4	118.7	3.8%
Sparse Forest	0.0	1.0	1.0	0.2	72.5	73.8	2.4%
Disturbance - Harvest	0.0	0.1	0.1	0.1	5.4	5.6	0.2%
Disturbance - Fire	0.0	0.1	0.1	0.0	5.0	5.1	0.2%
Regenerating Forest	0.0	0.1	0.1	0.0	7.6	7.8	0.3%
Subtotal:	0.0	3.6	3.6	4.7	486.6	495.0	16.0%
All Forest:	0.0	4.9	4.9	5.6	527.6	538.1	17.4%
Forest Proportion:	0.0%	0.9%	0.9%	1.0%	98.1%	100.0%	
Grand Total:	0.0	93.5	93.5	11.7	2,984.6	3,089.8	100.0%
Vc Total Proportion:	0.0%	3.0%	3.0%	0.4%	96.6%	100.0%	

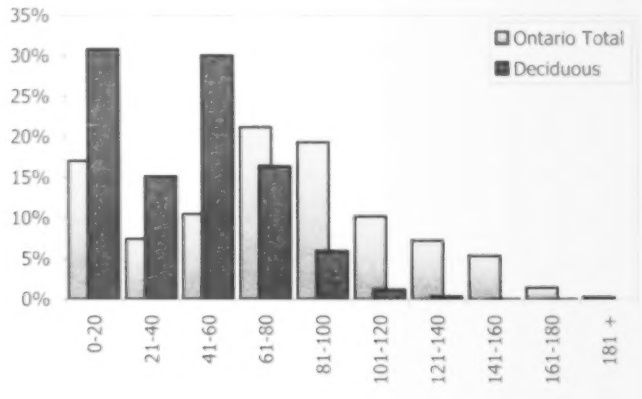
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



4.1.4 - Geographic Profile - Inventory Data — Forest Regions - Deciduous Forest

Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20									
21-40									
41-60									
61-80									
81-100									
101-120									
121-140									
141-160									
161-180									
181 +									
Total:									

*No data available for inventory summaries

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling									
Sapling									
Immature									
Mature									
Old Growth									
Total:									

*No data available for inventory summaries

Proportion of Profile Area within AOU (all ownerships)

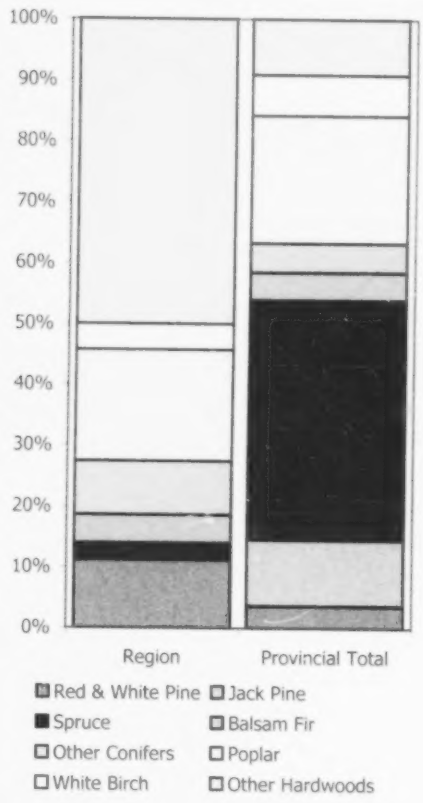
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	0.0	0.0%	0.0	0.0%
Total Area:	0.0	0.0%	0.0	0.0%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	8,169.6	5,364.4	72.4	95.0
Red Pine	1,485.0	1,088.8	16.4	23.1
Jack Pine	165.9	119.4	1.1	2.4
Black Spruce	391.8	241.8	3.2	4.2
White Spruce	1,803.8	1,187.8	18.2	21.5
Balsam Fir	3,980.3	1,797.4	42.2	48.3
Cedar	5,018.4	1,839.3	45.5	56.2
Larch	353.1	136.1	3.4	4.1
Hemlock	2,214.4	1,521.1	21.0	25.8
Other Conifers	20.8	5.8	0.5	0.4
Poplar	15,764.6	10,368.4	90.2	194.9
White Birch	3,664.6	2,301.0	13.9	43.3
Hard Maple	19,235.5	12,227.5	204.4	216.8
Yellow Birch	1,048.5	795.8	9.0	10.6
Ash	2,826.6	1,946.4	37.3	35.9
Oak	7,687.3	5,689.2	80.2	86.6
Other Hardwoods	12,307.5	8,771.0	146.8	148.2
Total	86,137.5	55,401.1	805.7	1,017.3
Proportion of Ontario:	**1.2%**	**1.3%**	**1.3%**	**1.2%**

Proportion of Volume by Species



4.2 – Management Zones

The Northern Boreal Forest reflects the large expanse of forest directly north of the AOU. It includes portions of both the Boreal Forest and Hudson Bay Lowlands. The Crown land within this zone is not available for harvesting within the context of a forest management plan. Most of this region is inaccessible by road, and the isolated communities that exist in the area generally have to be accessed by bushplane. Approximately 12,000 people live in this zone.

The Planning Area (PA) was derived during Ontario's Living Legacy project as an area that includes both the AOU and the large parks that fall on its borders (part of Wabikimi, Woodland Caribou, Quetico, Lake Superior Park, and Pukaskwa). A summary of the Planning Area is contained in this chapter; however, because the AOU is summarized in detail in chapter 3 it is not included here.

The Planning Area includes portions of both the Boreal Forest (66%) and the Great Lakes-St. Lawrence forest (33%) regions, and even a small portion of the Hudson Bay Lowlands (1%). Crown land within the Planning Area (which happens to also fall within the AOU) is where forests are actively managed through the forest management planning process. This zone has a population of approximately 1,021,000 people, most of whom live in the southern portions of this area.

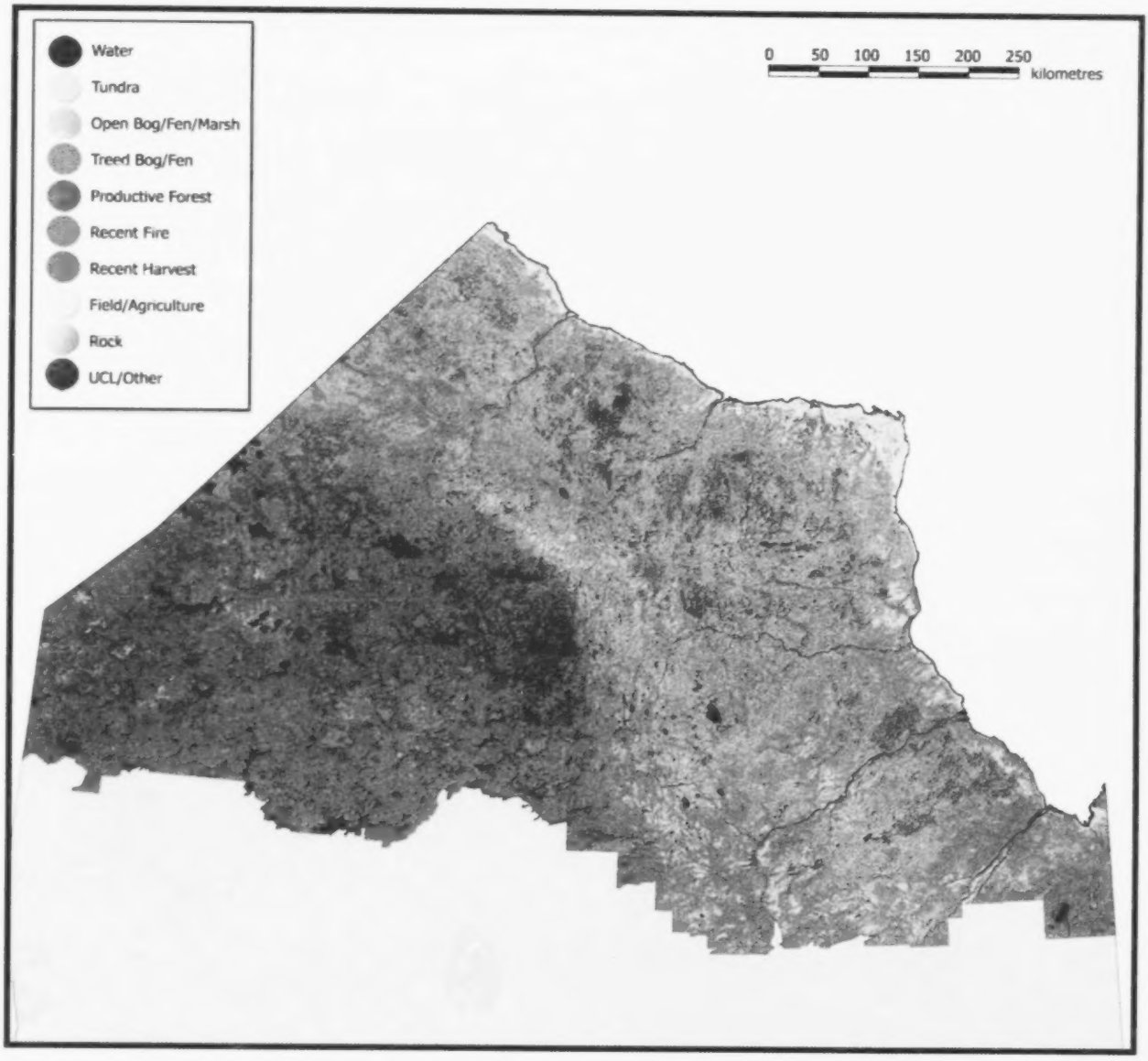
Southern Ontario is the area south of the AOU where most people in the province live and are most familiar with. This area includes the area south of Bracebridge and Kemptville, all of Manitoulin Island and the Bruce Peninsula. Southern Ontario includes both the Great Lakes-St. Lawrence forest region and the Deciduous forest region. The majority of land ownership in this zone is private, and any small Crown parcels that do exist in this zone are summarized under the "Other" ownership class, which includes federal, private and First Nations lands, as that data layer is not currently available. Southern Ontario has a population of approximately 10,361,000 people.

Planning Area - Harvesting Jack Pine and Spruce on Crown Forests

4.2.1 - Geographic Profile - Map

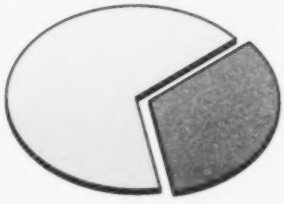
Management Zones - Northern Boreal Forest

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

Profile Forest as Proportion of Ontario's Forest

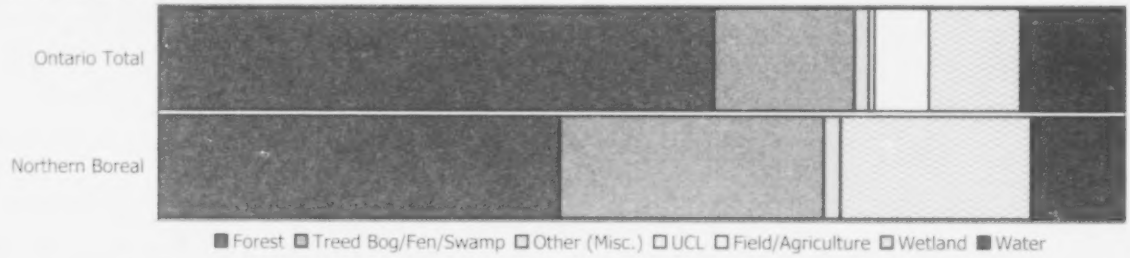


4.2.1 - Geographic Profile - Satellite Data — Management Zones - Northern Boreal Forest

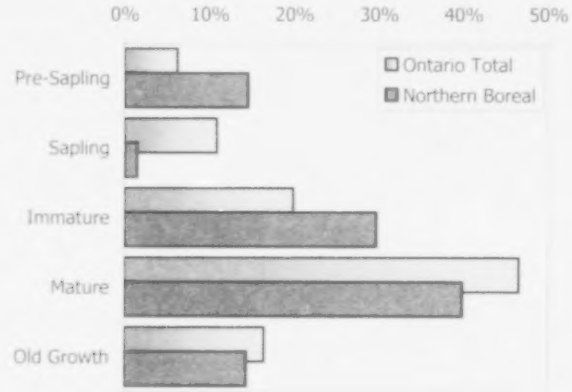
Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	*Proportion*
Non-forested Land					
Water	3,956.3	429.1	0.0	4,385.4	9.7%
Wetland	7,899.8	993.2	11.3	8,904.3	19.7%
Rock	137.6	18.2	0.2	156.0	0.3%
Field/Agriculture	0.0	0.0	0.0	0.0	0.0%
UCL	9.7	0.0	3.2	13.0	0.0%
Other (Misc.)	295.5	260.8	1.9	558.2	1.2%
Other (Unknown/Cloud)	62.0	0.4	0.1	62.5	0.1%
Subtotal:	12,360.9	1,701.6	16.8	14,079.3	31.1%
Non-productive Forest					
Swamp	0.6	0.0	0.0	0.6	0.0%
Treed Bog & Fen	11,418.2	897.1	44.0	12,359.3	27.3%
Subtotal:	11,418.7	897.1	44.0	12,359.8	27.3%
Productive Forest					
Dense Deciduous	288.9	23.6	6.0	318.4	0.7%
Dense Conifer	5,806.3	200.4	42.9	6,049.6	13.4%
Mixed Forest	2,145.2	131.2	20.9	2,297.3	5.1%
Sparse Forest	6,824.5	287.9	33.0	7,145.4	15.8%
Disturbance - Harvest	1.1	0.0	0.0	1.1	0.0%
Disturbance - Fire	1,686.5	150.4	8.3	1,845.2	4.1%
Regenerating Forest	1,074.0	84.7	14.0	1,172.7	2.6%
Subtotal:	17,826.3	878.2	125.1	18,829.6	41.6%
All Forest:	29,245.1	1,775.3	169.1	31,189.5	68.9%
Forest Proportion:	93.8%	5.7%	0.5%	100.0%	
Grand Total:	41,606.0	3,477.0	185.9	45,268.8	100.0%
Total Proportion:	91.9%	7.7%	0.4%	100.0%	

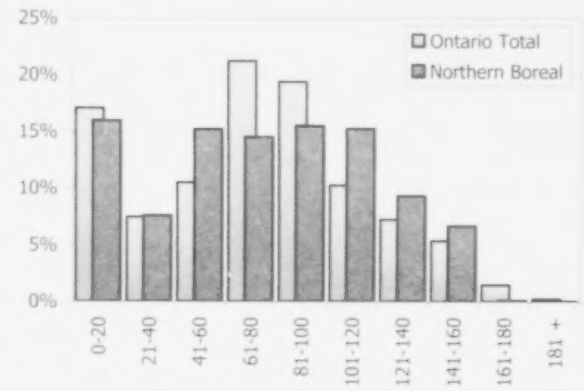
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



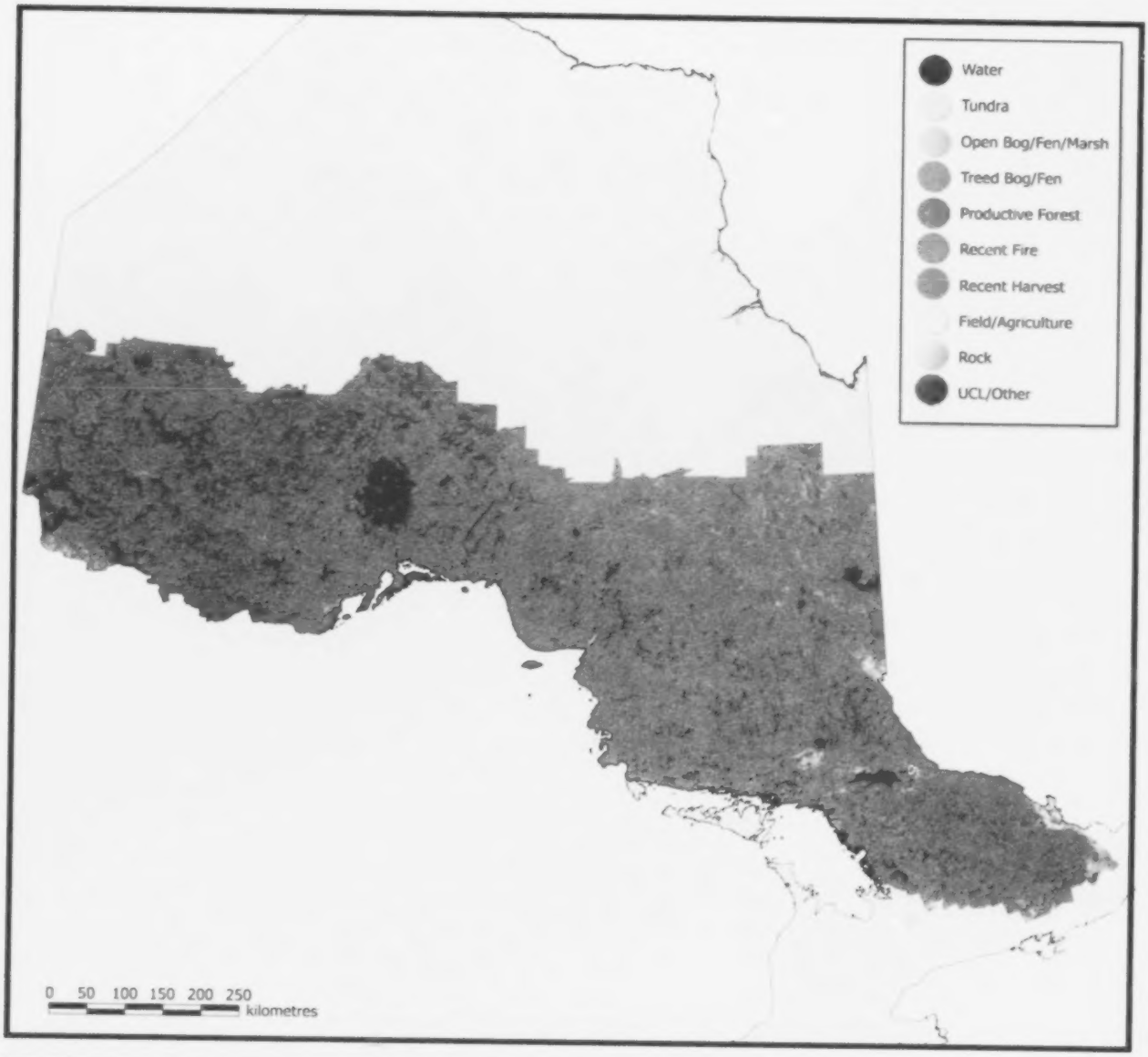
Age Class Structure - Profile Area vs. Provincial Average



4.2.2 - Geographic Profile - Map

Management Zones - Planning Area

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

All Land/Water 42.1%

Profile Forest as Proportion of Ontario's Forest

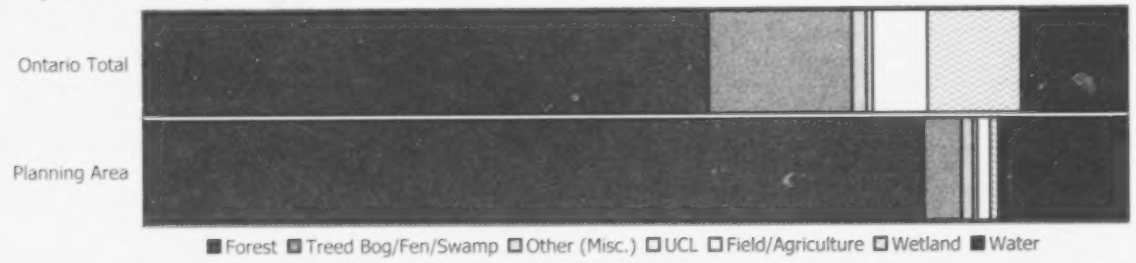
Productive Forest 63.2%

4.2.2 - Geographic Profile - Satellite Data — Management Zones - Planning Area

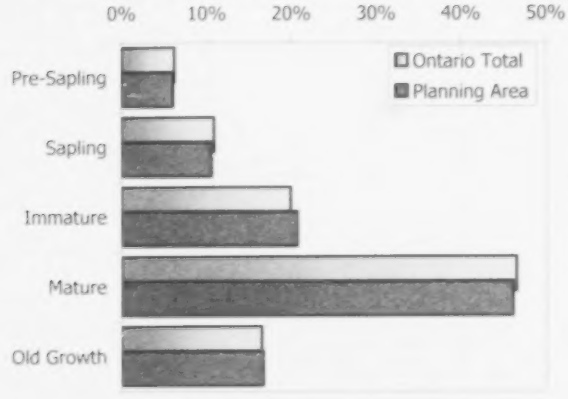
Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	*Proportion*
Non-forested Land					
Water	4,837.3	1,125.1	0.0	5,962.4	13.2%
Wetland	271.0	69.4	34.2	374.6	0.8%
Rock	105.9	76.4	115.5	297.9	0.7%
Field/Agriculture	16.5	0.8	571.8	589.1	1.3%
UCL	42.3	2.3	148.3	192.9	0.4%
Other (Misc.)	39.2	25.7	9.1	74.0	0.2%
Other (Unknown/Cloud)	73.9	49.7	27.6	151.2	0.3%
Subtotal:	5,386.2	1,349.5	906.6	7,642.2	16.9%
Non-productive Forest					
Swamp	0.1	0.4	19.5	20.0	0.0%
Treed Bog & Fen	1,337.2	215.1	171.4	1,723.7	3.8%
Subtota':	1,337.3	215.5	190.9	1,743.7	3.8%
Productive Forest					
Dense Deciduous	2,943.4	492.3	1,180.6	4,616.4	10.2%
Dense Conifer	7,704.0	1,214.6	740.8	9,659.4	21.3%
Mixed Forest	9,466.3	1,390.5	1,946.5	12,803.3	28.3%
Sparse Forest	4,519.3	815.0	916.6	6,250.9	13.8%
Disturbance - Harvest	2,040.8	32.8	162.5	2,236.2	4.9%
Disturbance - Fire	207.2	86.3	4.7	298.1	0.7%
Regenerating Forest	23.2	14.3	4.2	41.7	0.1%
Subtotal:	26,904.2	4,045.8	4,956.0	35,906.1	79.3%
All Forest:	28,241.6	4,261.3	5,146.9	37,649.8	83.1%
Forest Proportion:	75.0%	11.3%	13.7%	100.0%	
Grand Total:	33,627.7	5,610.8	6,053.4	45,292.0	100.0%
Vc Total Proportion:	74.2%	12.4%	13.4%	100.0%	

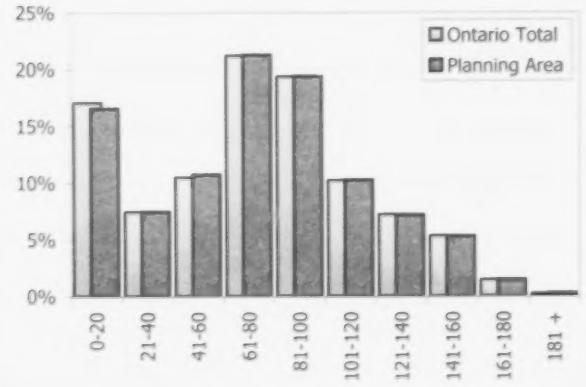
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



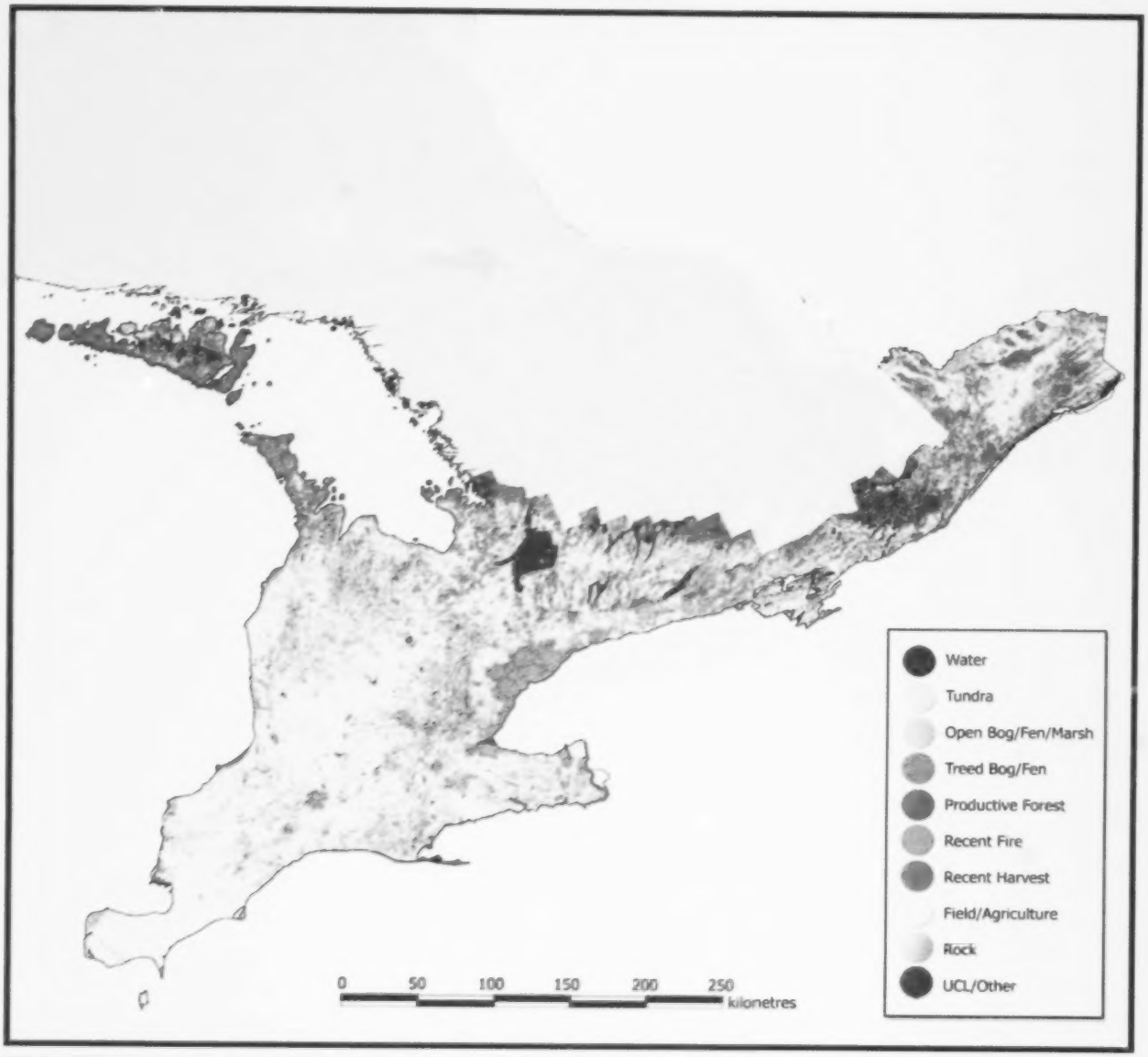
Age Class Structure - Profile Area vs. Provincial Average



4.2.3 - Geographic Profile - Map

Management Zones - Southern Ontario

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

All Land/Water 7.6%

Profile forest as Proportion of Ontario's Forest

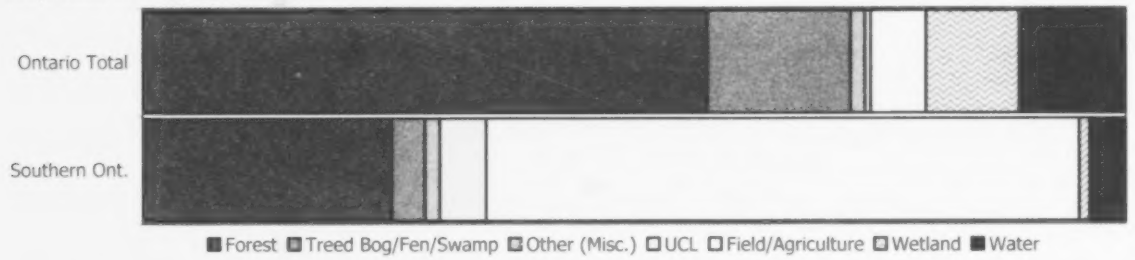
Productive Forest 3.6%

4.2.3 - Geographic Profile - Satellite Data — Management Zones - Southern Ontario

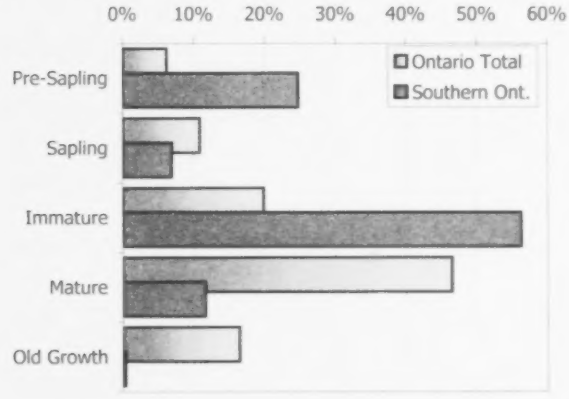
Area in thousands of hectares

Land Class	Crown	Protected Areas	Other	Total	*Proportion*
Non-forested Land					
Water	294.0	4.3	0.0	298.3	3.7%
Wetland	0.0	2.6	82.8	85.4	1.0%
Rock	0.0	0.9	67.0	67.9	0.8%
Field/Agriculture	0.0	4.6	4,910.0	4,914.6	60.3%
UCL	0.0	0.3	384.3	384.6	4.7%
Other (Misc.)	0.0	0.4	37.5	37.9	0.5%
Other (Unknown/Cloud)	0.0	0.1	16.9	17.0	0.2%
Subtotal:	294.0	13.3	5,498.4	5,805.7	71.2%
Non-productive Forest					
Swamp	0.0	1.3	97.9	99.3	1.2%
Treed Bog & Fen	0.0	1.7	176.0	177.7	2.2%
Subtotal:	0.0	3.1	273.9	277.0	3.4%
Productive Forest					
Dense Deciduous	0.0	7.7	722.1	729.8	9.0%
Dense Conifer	0.0	10.1	285.4	295.6	3.6%
Mixed Forest	0.0	8.5	688.3	696.8	8.5%
Sparse Forest	0.0	3.4	255.2	258.6	3.2%
Disturbance - Harvest	0.0	0.1	27.0	27.0	0.3%
Disturbance - Fire	0.0	0.1	28.6	28.7	0.4%
Regenerating Forest	0.0	0.1	34.3	34.4	0.4%
Subtotal:	0.0	29.9	2,041.0	2,070.9	25.4%
All Forest:	0.0	33.0	2,314.9	2,347.9	28.8%
Forest Proportion:	0.0%	1.4%	98.6%	100.0%	
Grand Total:	294.0	46.3	7,813.2	8,153.6	100.0%
Total Proportion:	3.6%	0.6%	95.8%	100.0%	

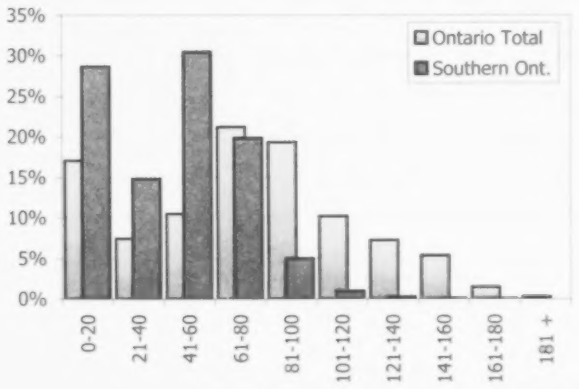
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



4.3 – Ownerships

Ontario is dominated by Crown or publicly owned land, which makes up over 84.1 million hectares, or 78% of its landbase, not including the parks and protected areas, which are also publicly owned and make up another 9.3 million hectares, or 9% of Ontario. Other ownership classes include private, federal and First Nations lands.

Parks and Protected Areas

The parks and protected areas category consists of national parks, provincial parks, conservation reserves, and forest reserves. This version of *The Forest Resources of Ontario* includes both recommended and regulated protected areas identified as part of the 1999 MNR Land Use Strategy. Since regulation of these protected areas is an ongoing process, there may be slight differences in area between this publication and the current total area. Within Algonquin Park, only the zones unavailable for commercial forest management are included within this category. Algonquin's Recreation/Utilization zone, which is available for commercial forest management, is included under Crown land summaries. Other protected areas not represented in this category include those managed by land trusts, environmental non-governmental organizations, and conservation authorities.

The Protected Areas ownership category is found throughout this document, and is made up of:

- Provincial parks (80%)
- Conservation reserves (17%)
- Forest reserves (1%)
- Federal or National parks (2%).

Figure 4.3.2 gives a detailed breakdown of area by protected area type.

Provincial parks range in size from very small parcels of land in southern Ontario, such as Port Bruce Provincial Park (less than 6 hectares), to Polar Bear Provincial Park (2.3 million hectares) in the northern portion of the Hudson Bay lowlands. Forests occupy approximately 62% of the land within Provincial parks. There are currently six classes of provincial parks including: wilderness; nature reserve; natural environment; waterway; recreational; and historical.

Conservation reserves are generally found within the AOU, and cover 1.6 million hectares. This class of protected area has a higher proportion of forest cover than provincial parks, at 75%.

Forest reserves are, as the name suggests, areas of forest set aside from harvest operations. The Lake Superior Highlands south

Parks and Protected Areas - Lake Superior Provincial Park

of Pukaskwa National park are an example of forest reserves.

Forests occupy 81% of the land area within this park class. National parks in Ontario are dominated by Pukaskwa National Park near White River, Ontario, at over 180,000 hectares. Ontario's other national parks include Georgian Bay Islands, Point Pelee, St. Lawrence and Fathom Five. National parks have the highest proportion of forest cover at 87%.

Private Land

Private (also called patent land) makes up the largest proportion of the "other" ownership category referred to in this publication. Approximately 12% of Ontario is privately owned, and about 50% of that area is forested. Only about 35% of private forests are found in Southern Ontario (south of the AOU).

Private land is a complex set of ownership classes which include varying levels of ownership, from completely private to only portions or aspects of the parcel being private. Private land owners can be farmers or woodlot owners in southern Ontario, cottage owners in the Muskokas, or a forest company with large managed forest areas in northern Ontario. There are several large parcels of privately managed forest in northern Ontario, some more than 50,000 or 100,000 hectares in size. There are also areas of private land which are owned by the Crown, but these areas are reported here as private.

The largest forest cover class on private land is hardwood and mixwood productive forests at 49%, and developed agriculture and field at 41%. Since water is almost exclusively owned by the Crown in Ontario, no water falls within this ownership category.

First Nations Land

Land within First Nations is the next largest non-Crown ownership class, covering 629,000 hectares (0.6%) of Ontario. These areas are not completely represented in this document, but attempts have been made to include all data from available sources. Generally the ownership classes found within the AOU are the most accurate, but northern communities such as Bearskin Lake and Attawapiskat, and southern communities such as Walpole Island have been added from other data sources. Approximately half of all First Nations land falls within the AOU, another third in the northern Boreal, and the remainder in southern Ontario.

First Nations land is dominated by forests, at 87% forest cover, with an even split between all forest types.

Federal Lands

Federal lands make up the smallest proportion of the "other" ownership at approximately 85,000 hectares (0.1% of Ontario). These lands are made up of mostly Department of National Defence lands such as Petawawa, North Bay and Burwash. Federal lands are dominated by forest, at 93% forest cover.

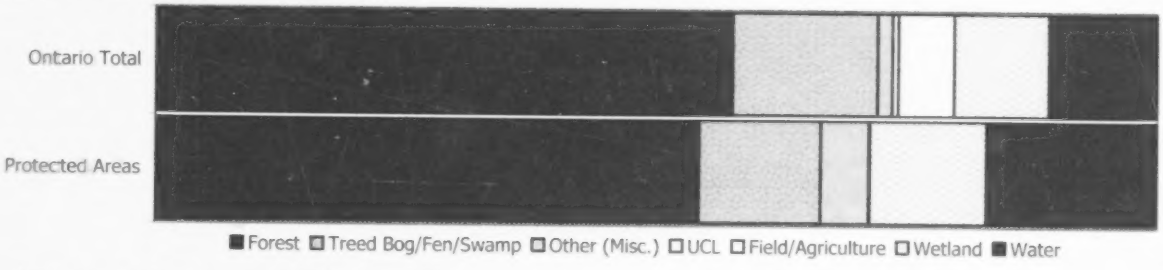
Private Land - Southern Ontario Woodlot

4.3.1 - Geographic Profile - Satellite Data — Ownership Classes - Protected Areas

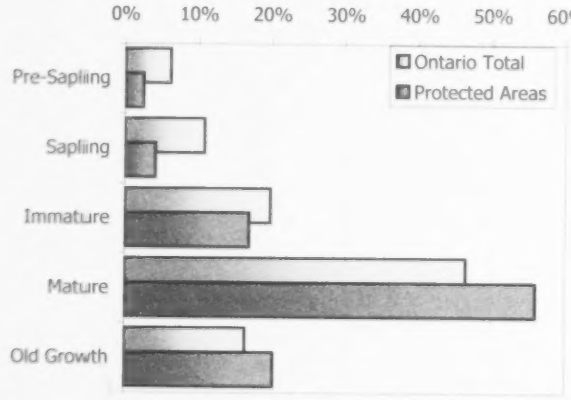
Area in thousands of hectares

Land Class	Provincial Parks	Conservation Reserves	Forest Reserves	National Parks	Total Parks	*Proportion*
Non-forested Land						
Water	1,386.1	313.7	9.1	20.2	1,729.1	18.5%
Wetland	1,011.6	50.8	1.6	1.6	1,065.6	11.4%
Rock	78.5	22.0	1.2	3.2	105.0	1.1%
Field/Agriculture	5.2	0.2	0.0	0.2	5.6	0.1%
UCL	2.1	0.7	0.1	0.0	2.8	0.0%
Other (Misc.)	284.3	2.3	0.1	0.3	287.0	3.1%
Other (Unknown/Cloud)	40.8	9.3	0.0	0.1	50.3	0.5%
Subtotal:	2,808.7	399.0	12.1	25.6	3,245.4	34.8%
Non-productive Forest						
Swamp	1.0	0.3	0.0	0.5	1.8	0.0%
Treed Bog & Fen	1,009.2	99.8	3.9	1.5	1,114.3	11.9%
Subtotal:	1,010.2	100.1	3.9	2.0	1,116.1	12.0%
Productive Forest						
Dense Deciduous	345.9	107.3	7.9	63.7	524.9	5.6%
Dense Conifer	1,054.1	324.7	13.5	34.4	1,426.7	15.3%
Mixed Forest	1,045.9	397.1	20.0	71.7	1,534.6	16.5%
Sparse Forest	858.8	236.4	5.6	9.1	1,109.9	11.9%
Disturbance - Harvest	18.3	13.6	0.8	0.2	32.9	0.4%
Disturbance - Fire	210.5	26.1	0.0	0.1	236.7	2.5%
Regenerating Forest	98.7	0.3	0.0	0.0	99.1	1.1%
Subtotal:	3,632.3	1,105.5	48.0	179.1	4,964.8	53.2%
All Forest:	4,642.4	1,205.6	51.8	181.1	6,081.0	65.2%
Forest Proportion:	76.3%	19.8%	0.9%	3.0%	100.0%	
Grand Total:	7,451.1	1,604.6	63.9	206.7	9,326.3	100.0%
Total Proportion:	79.9%	17.2%	0.7%	2.2%	100.0%	

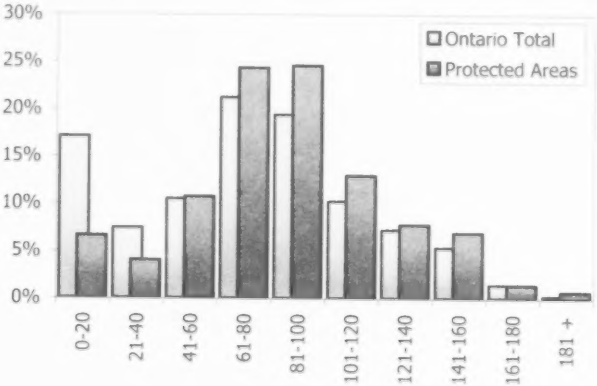
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average

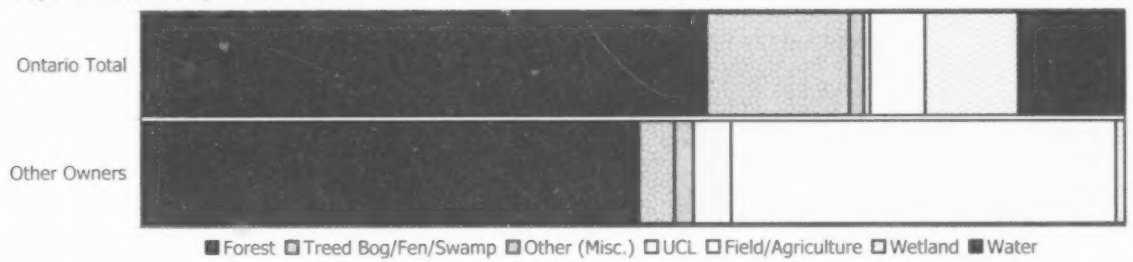


4.3.2 - Geographic Profile - Satellite Data — Ownership Classes - Other

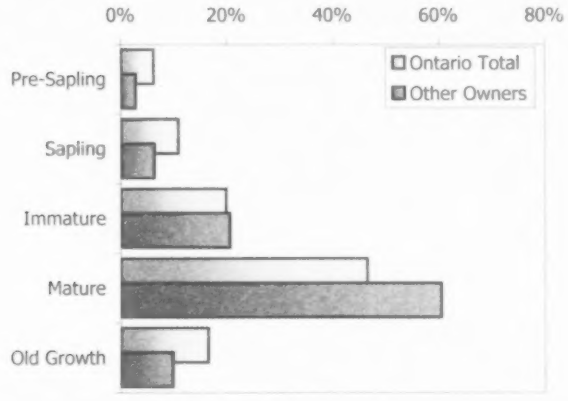
Area in thousands of hectares

Land Class	Patent (Private)	First Nations	Federal	Total Other	*Proportion*
Non-forested Land					
Water	0.0	0.0	0.0	0.0	0.0%
Wetland	108.8	21.9	0.2	130.9	0.9%
Rock	167.1	15.4	0.7	183.3	1.3%
Field/Agriculture	5,467.0	34.0	0.3	5,501.3	39.1%
UCL	526.8	8.1	1.8	536.7	3.8%
Other (Misc.)	45.6	3.2	0.1	48.9	0.3%
Other (Unknown/Cloud)	44.1	0.5	0.1	44.7	0.3%
Subtotal:	6,359.4	83.1	3.2	6,445.7	45.8%
Non-productive Forest					
Swamp	117.0	1.4	0.0	118.4	0.8%
Treed Bog & Fen	332.4	56.6	2.8	391.8	2.8%
Subtotal:	449.3	58.0	2.8	510.2	3.6%
Productive Forest					
Dense Deciduous	1,811.6	94.9	5.5	1,912.1	13.6%
Dense Conifer	965.4	79.6	24.8	1,069.8	7.6%
Mixed Forest	2,454.4	177.7	25.0	2,657.1	18.9%
Sparse Forest	1,087.4	104.6	14.3	1,206.3	8.6%
Disturbance - Harvest	173.4	7.3	9.2	189.9	1.3%
Disturbance - Fire	33.1	8.9	0.1	42.2	0.3%
Regenerating Forest	38.4	14.6	0.0	52.9	0.4%
Subtotal:	6,563.7	487.6	78.9	7,130.2	50.6%
All Forest:	7,013.0	545.7	81.7	7,640.4	54.2%
Forest Proportion:	91.8%	7.1%	1.1%	100.0%	
Grand Total:	13,372.4	628.8	84.9	14,086.1	100.0%
Total Proportion:	94.9%	4.5%	0.6%	100.0%	

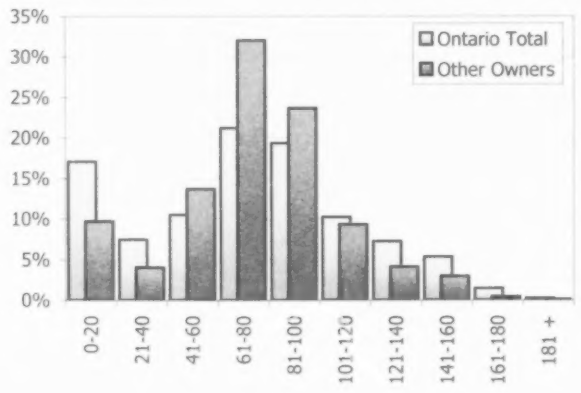
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



Geographic Profiles

4.4 – Administrative Regions

As stated in the introduction, the Ontario Ministry of Natural Resources (MNR) currently has three main administrative regions. Great Lakes water is not part of this summary group.

Northwest Region

The Northwest Region (Thunder Bay) is a large tract of Boreal and Boreal transitional forest that ranges from Terrace Bay on the north shore of Lake Superior through to the northern extent of the Boreal forest in the extreme northwest corner of the province.

The northwest is dominated by upland coniferous and mixedwood forests, composed of spruce, jack pine and poplar. This region is also much more susceptible to forest fire than the rest of the province, and 78% of all recently burned area in the satellite summaries is located in the northwest.

Approximately 12 million hectares of Crown production forest is in the northwest region, accounting for 44% of Ontario's Crown managed forest.

Northeast Region

The Northeast Region (Timmins) is a huge expanse of Great Lakes-St. Lawrence transitional, Boreal, and Hudson Bay lowland forests, stretching from North Bay to the northern limit of the province.

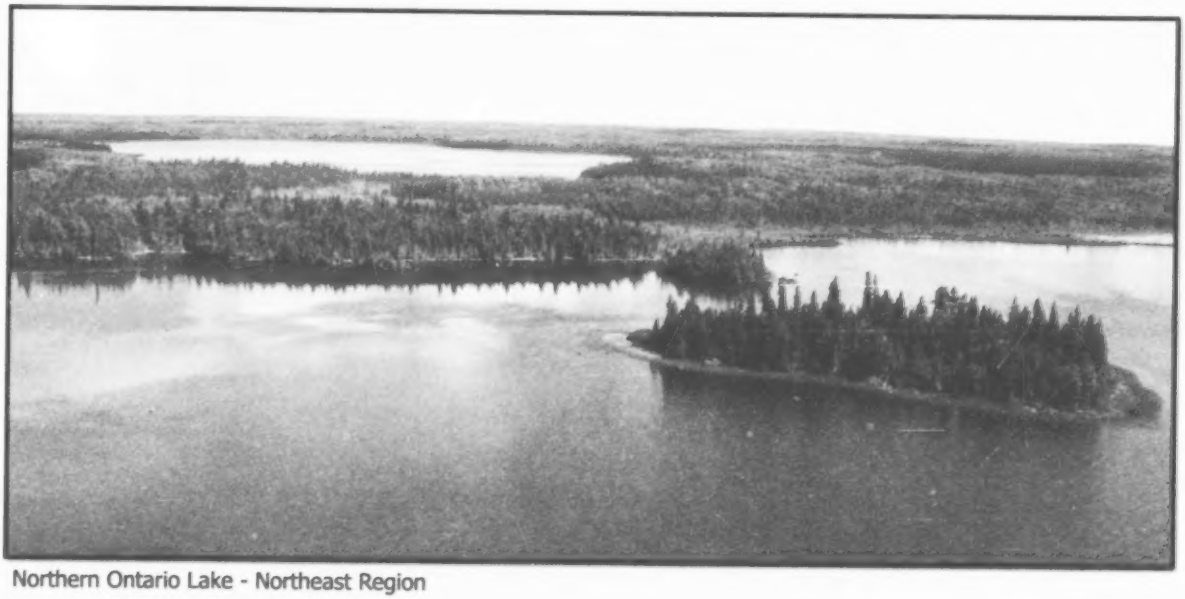
The northeast is dominated by lowland spruce forests within the Boreal portion of the region. Great Lakes-St. Lawrence transitional forests make up the southern portions, with white pine, maple and other hardwoods.

Approximately 13.5 million hectares of Crown production forest is in the northeast region, accounting for 50% of Ontario's Crown managed forest.

Southern Region

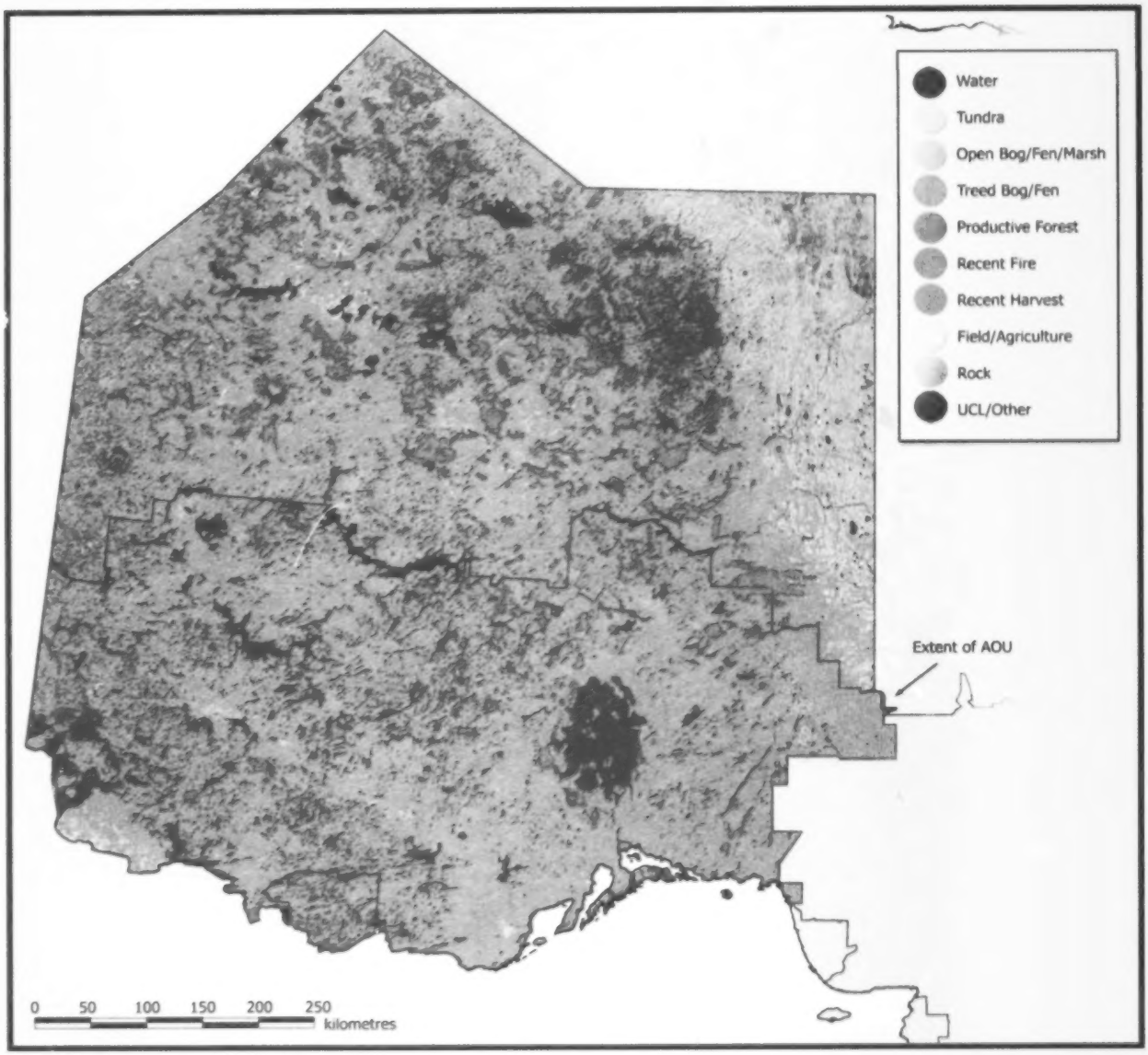
The Southern Region (Peterborough) is the smallest administrative region in the province, but also contains the highest human population. The Great Lakes-St. Lawrence/Deciduous forests of this region are dominated by hardwood forest and agricultural land.

Approximately 1.5 million hectares of Crown production forest is located in the southern region, accounting for 6% of Ontario's Crown managed forests. However, nearly 60% of Ontario's private land forest exists in this region.



Northern Ontario Lake - Northeast Region

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

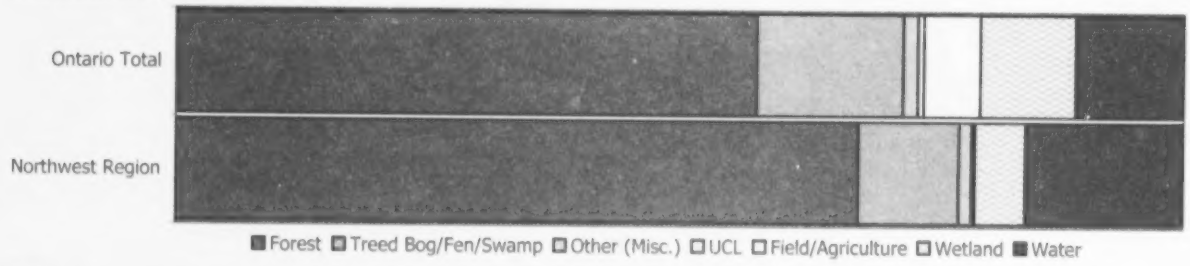
Profile Forest as Proportion of Ontario's Forest

4.4.1 - Geographic Profile - Satellite Data — Administrative Regions - Northwest Region

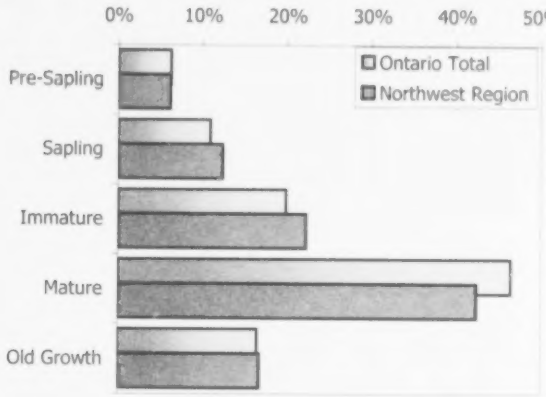
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	2,981.4	2,590.8	5,572.2	994.6	0.0	6,566.8	15.7%
Wetland	93.7	1,915.1	2,008.7	71.6	10.7	2,091.1	5.0%
Rock	35.1	99.5	134.6	17.3	3.0	154.8	0.4%
Field/Agriculture	7.8	0.0	7.9	0.1	72.7	80.6	0.2%
UCL	15.5	8.8	24.3	0.4	29.4	54.0	0.1%
Other (Misc.)	34.3	158.0	192.3	29.9	4.8	227.0	0.5%
Other (Unknown/Cloud)	38.2	63.2	101.3	43.5	3.3	148.1	0.4%
Subtotal:	3,205.8	4,835.4	8,041.3	1,157.3	123.9	9,322.4	22.3%
Non-productive Forest							
Swamp	0.0	0.4	0.4	0.0	0.0	0.4	0.0%
Treed Bog & Fen	539.8	3,373.3	3,913.1	212.6	51.5	4,177.1	10.0%
Subtotal:	539.8	3,373.7	3,913.5	212.6	51.5	4,177.5	10.0%
Productive Forest							
Dense Deciduous	885.4	239.1	1,124.5	141.4	171.7	1,437.6	3.4%
Dense Conifer	3,373.3	4,056.3	7,429.6	876.5	148.2	8,454.4	20.3%
Mixed Forest	3,693.3	1,497.1	5,190.4	740.2	348.8	6,279.4	15.1%
Sparse Forest	2,851.4	4,359.6	7,211.0	778.0	312.0	8,301.0	19.9%
Disturbance - Harvest	916.1	0.0	916.2	11.9	47.4	975.5	2.3%
Disturbance - Fire	176.4	1,328.1	1,504.6	180.7	9.4	1,694.7	4.1%
Regenerating Forest	23.2	939.3	962.5	96.6	14.7	1,073.8	2.6%
Subtotal:	11,919.1	12,419.6	24,338.7	2,825.4	1,052.2	28,216.4	67.6%
All Forest:	12,458.9	15,793.3	28,252.2	3,038.0	1,103.7	32,393.9	77.7%
Forest Proportion:	38.5%	48.8%	87.2%	9.4%	3.4%	100.0%	
Grand Total:	15,664.7	20,628.7	36,293.5	4,195.3	1,227.5	41,716.3	100.0%
Total Proportion:	37.6%	49.5%	87.0%	10.1%	2.9%	100.0%	

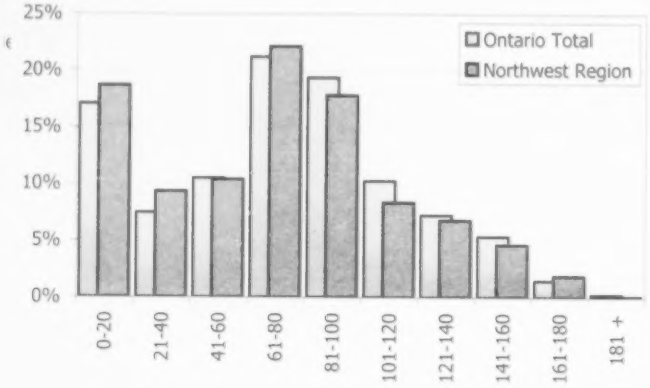
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	16.3	558.2	906.8	248.9	392.8	296.5	53.4	3.4	2,476.3
21-40	3.2	341.3	236.5	54.0	424.6	151.9	24.3	1.0	1,236.9
41-60	1.9	136.1	365.9	109.7	456.7	210.8	86.4	8.3	1,375.8
61-80	8.5	247.5	861.6	267.5	898.3	484.1	144.9	19.7	2,932.2
81-100	13.4	172.6	859.2	349.0	605.6	281.3	70.2	10.8	2,362.1
101-120	13.9	35.5	424.8	312.9	205.0	85.6	27.7	1.5	1,106.9
121-140	8.8	27.2	309.0	450.9	76.7	19.6	5.6	0.6	898.4
141-160	4.4	6.3	238.9	329.6	29.0	3.3	0.5	0.1	612.1
161-180	2.2	0.5	92.9	150.6	4.0	0.2	0.0	0.1	250.5
181 +	1.3	0.1	4.1	4.5	0.5	0.0	0.0	0.0	10.6
Total:	74.0	1,525.3	4,299.7	2,277.6	3,093.3	1,533.2	413.1	45.5	13,261.7

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	10.0	172.6	270.3	186.2	95.0	77.8	17.6	2.2	831.8
Sapling	6.3	385.6	636.6	94.0	297.9	174.3	28.3	1.4	1,624.3
Immature	10.5	512.9	747.2	302.8	881.3	328.7	85.3	13.7	2,882.4
Mature	40.7	395.8	1,675.2	1,022.2	1,559.6	794.0	234.7	27.2	5,749.5
Old Growth	6.5	58.3	970.4	672.3	259.5	158.5	47.1	1.0	2,173.8
Total:	74.0	1,525.3	4,299.7	2,277.6	3,093.3	1,533.2	413.1	45.5	13,261.7

Proportion of Profile Area within AOU (all ownerships)

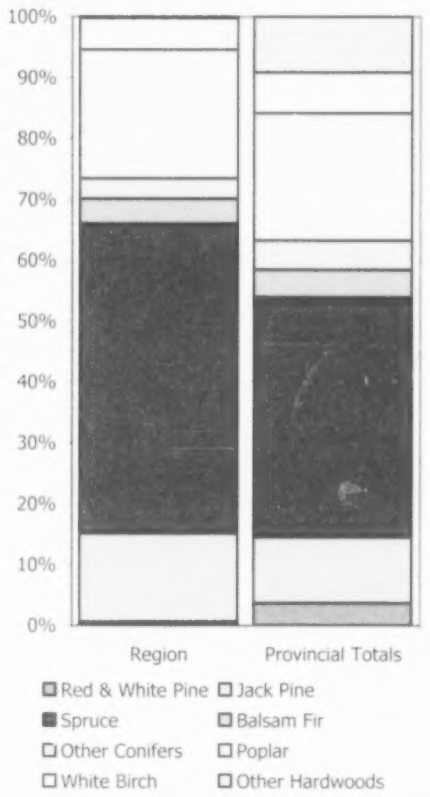
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	14,279.7	50.6%	13,261.7	47.0%
Total Area:	18,872.4	45.2%	17,422.9	41.8%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	12,326.3	8,112.5	113.1	138.1
Red Pine	8,381.5	6,229.2	63.3	112.8
Jack Pine	518,419.8	351,674.5	5,034.9	8,707.2
Black Spruce	1,766,847.8	1,031,941.4	14,326.7	17,948.3
White Spruce	44,126.2	26,450.3	588.7	567.9
Balsam Fir	145,789.7	55,030.3	2,133.4	1,978.0
Cedar	59,699.7	18,363.7	420.3	547.1
Larch	59,454.9	19,452.3	422.7	550.0
Hemlock	0.5	0.4	0.0	0.0
Other Conifers	4.8	0.2	0.0	0.1
Poplar	751,592.7	463,883.1	6,860.0	10,393.9
White Birch	185,016.5	108,806.3	1,441.4	2,588.6
Hard Maple	154.8	93.4	1.8	1.9
Yellow Birch	80.0	Profile Area a:	0.8	0.9
Ash	5,835.9	4,034.1	75.7	73.3
Oak	49.6	31.9	0.7	0.7
Other Hardwoods	2,240.6	1,435.3	34.3	31.4
Total	3,560,021.2	2,095,538.8	31,517.9	43,640.1
Proportion of Ontario:	49.3%	48.6%	50.0%	50.2%

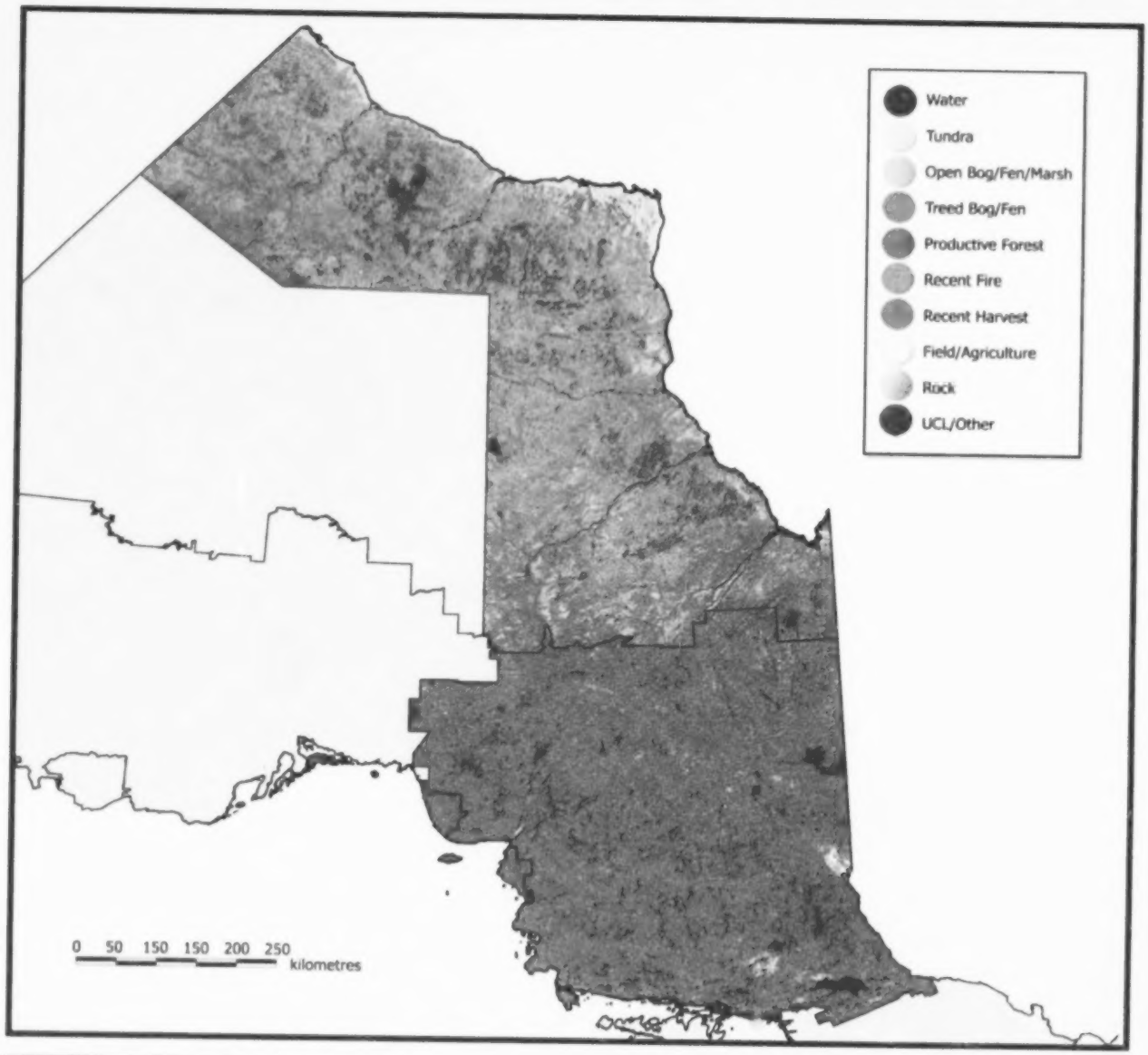
Proportion of Volume by Species



4.4.2 - Geographic Profile - Map

Administrative Regions - Northeast Region

2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area

All Land/Water 40.9%

Profile Forest as Proportion of Ontario's Forest

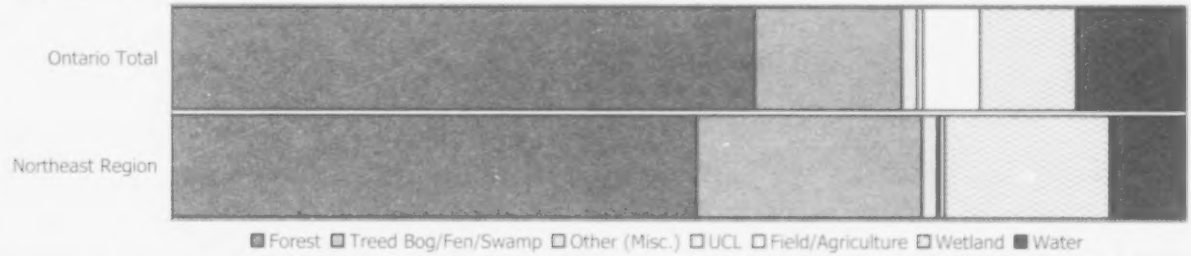
Productive Forest 40.1%

4.4.2 - Geographic Profile - Satellite Data — Administrative Regions - Northeast Region

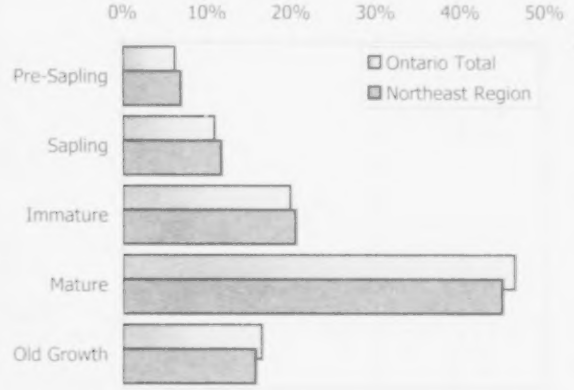
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	1,429.1	1,368.8	2,797.9	501.0	0.0	3,298.9	7.5%
Wetland	173.6	5,984.3	6,158.0	988.7	20.9	7,167.5	16.3%
Rock	55.0	39.7	94.7	48.6	71.4	214.6	0.5%
Field/Agriculture	5.0	0.0	5.0	0.3	196.6	201.9	0.5%
UCL	21.7	1.3	23.0	1.1	95.2	119.3	0.3%
Other (Misc.)	4.7	137.0	141.7	256.4	1.6	399.6	0.9%
Other (Unknown/Cloud)	17.2	0.2	17.4	4.4	6.8	28.6	0.1%
Subtotal:	1,706.2	7,531.4	9,237.6	1,800.4	392.5	11,430.5	26.0%
Non-productive Forest							
Swamp	0.0	0.2	0.2	0.0	0.0	0.2	0.0%
Treed Bog & Fen	762.6	8,044.8	8,807.5	890.5	97.8	9,795.7	22.2%
Subtotal:	762.6	8,045.0	8,807.7	890.5	97.9	9,796.0	22.2%
Productive Forest							
Dense Deciduous	1,675.6	50.1	1,725.6	307.8	501.2	2,534.6	5.8%
Dense Conifer	4,010.6	1,751.1	5,761.7	476.1	304.5	6,542.3	14.9%
Mixed Forest	5,136.2	650.5	5,786.7	637.9	897.9	7,322.5	16.6%
Sparse Forest	1,521.2	2,465.9	3,987.1	242.1	347.1	4,576.4	10.4%
Disturbance - Harvest	1,117.5	1.1	1,118.6	20.4	104.1	1,243.1	2.8%
Disturbance - Fire	30.6	358.3	388.9	55.9	0.3	445.2	1.0%
Regenerating Forest	0.0	134.6	134.6	2.4	0.0	137.0	0.3%
Subtotal:	13,491.7	5,411.6	18,903.2	1,742.7	2,155.2	22,801.1	51.8%
All Forest:	14,254.3	13,456.6	27,710.9	2,633.1	2,253.0	32,597.1	74.0%
Forest Proportion:	43.7%	41.3%	85.0%	8.1%	6.9%	100.0%	
Grand Total:	15,960.6	20,988.0	36,948.5	4,433.6	2,645.5	44,027.6	100.0%
Total Proportion:	36.3%	47.7%	83.9%	10.1%	6.0%	100.0%	

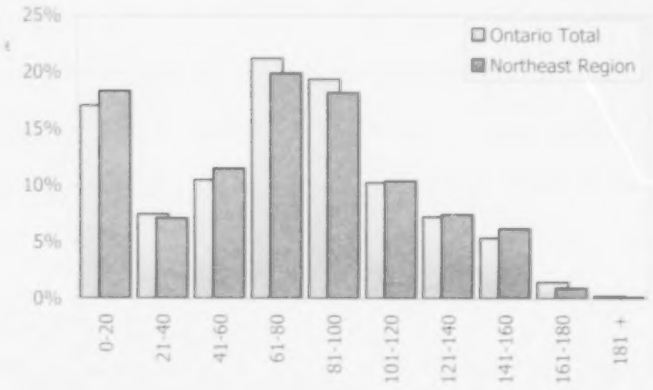
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



4.4.2 - Geographic Profile - Inventory Data — Administrative Regions - Northeast Region

Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	54.6	393.4	407.6	1,285.3	212.3	427.6	151.5	16.8	2,949.1
21-40	33.5	101.0	358.2	225.1	234.4	127.7	48.8	14.1	1,142.7
41-60	44.6	102.2	452.1	247.9	440.2	202.7	318.0	39.3	1,846.9
61-80	81.0	172.8	664.7	416.8	617.9	470.5	588.2	183.9	3,196.0
81-100	151.8	130.6	623.8	524.4	499.6	330.0	330.0	330.5	2,920.7
101-120	112.5	33.7	325.9	555.7	235.0	155.2	93.6	157.7	1,669.2
121-140	55.0	6.9	164.7	737.9	78.4	32.0	22.6	95.9	1,193.5
141-160	25.6	1.5	108.3	767.8	49.8	5.0	5.7	27.9	991.5
161-180	11.7	0.1	13.4	112.0	2.5	0.2	0.3	9.7	149.8
181 +	6.8	0.0	6.6	6.7	2.4	0.0	0.1	2.8	25.6
Total:	577.3	942.1	3,125.3	4,879.7	2,372.5	1,750.7	1,558.7	878.7	16,084.9

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	29.7	83.6	119.2	602.8	78.0	130.7	55.6	11.6	1,111.1
Sapling	25.0	309.8	288.4	847.9	134.3	195.6	74.9	7.2	1,883.1
Immature	133.4	240.3	953.8	589.7	674.6	352.2	241.9	77.6	3,263.5
Mature	351.8	283.7	1,278.1	1,688.2	1,214.0	823.1	1,014.1	613.0	7,266.1
Old Growth	37.5	24.7	485.8	1,151.1	271.6	249.1	172.1	169.3	2,561.1
Total:	577.3	942.1	3,125.3	4,879.7	2,372.5	1,750.7	1,558.7	878.7	16,084.9

Proportion of Profile Area within AOU (all ownerships)

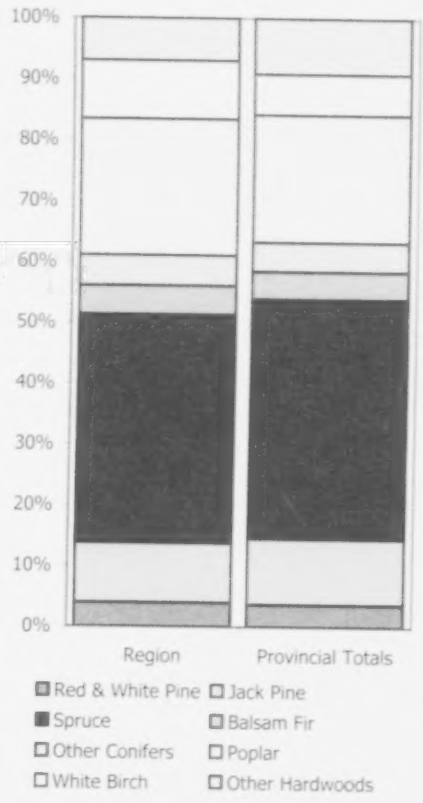
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	16,813.3	73.7%	16,084.9	70.5%
Total Area:	20,144.6	45.8%	20,144.6	45.8%

Volume by Tree Species - Estimates for Entire Profile Area

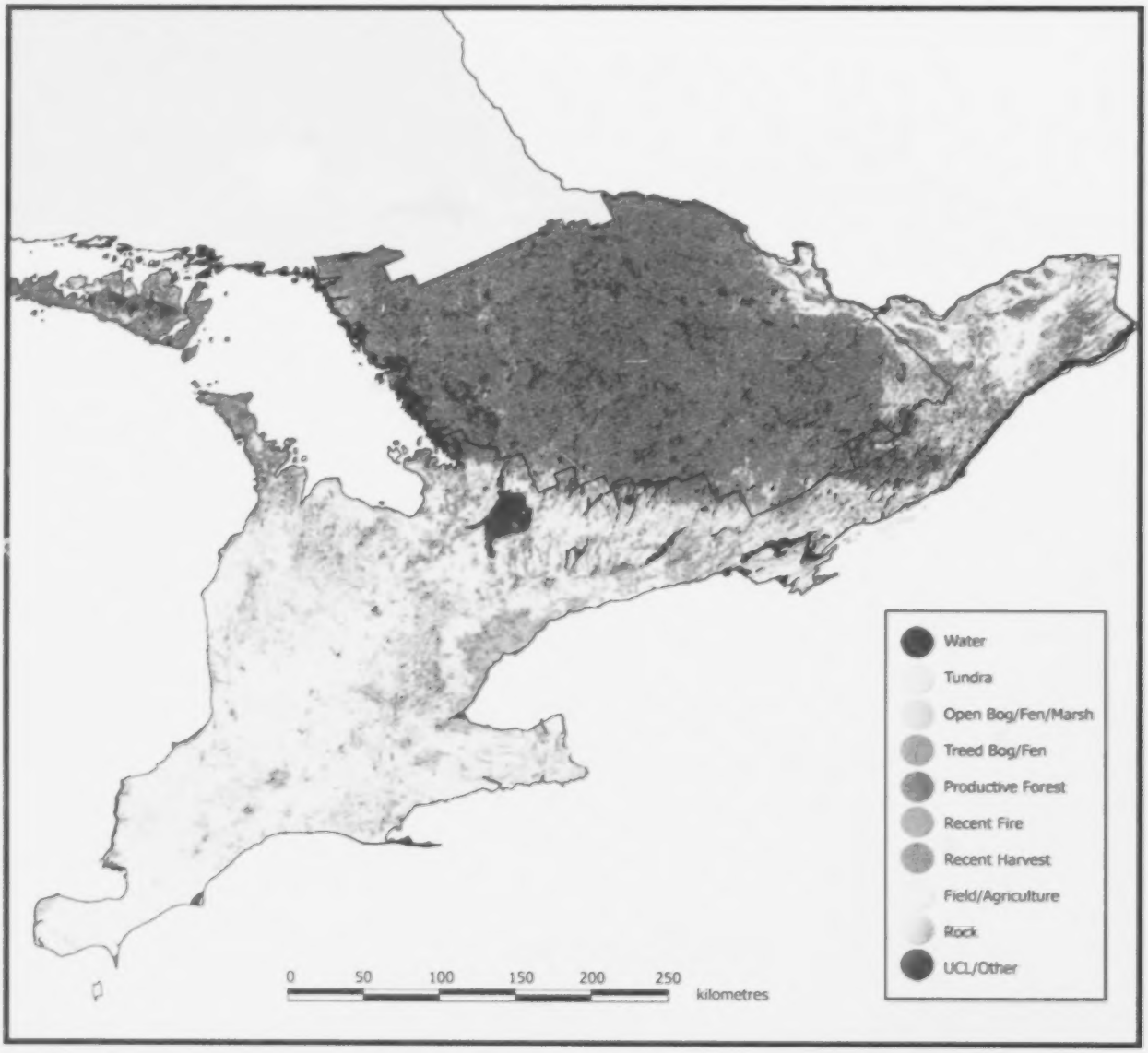
Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	84,289.1	54,943.6	805.2	970.7
Red Pine	20,422.6	14,949.9	192.7	292.3
Jack Pine	260,688.5	184,230.8	1,977.2	4,062.4
Black Spruce	922,894.7	532,809.5	7,699.9	9,410.8
White Spruce	74,549.4	43,013.3	972.0	933.3
Balsam Fir	127,584.6	45,689.7	1,947.9	1,740.9
Cedar	75,831.8	24,316.2	565.4	724.7
Larch	44,689.8	14,918.5	360.8	441.4
Hemlock	11,368.5	7,948.6	85.2	110.1
Other Conifers	64.3	16.3	1.9	1.2
Poplar	594,222.9	368,589.0	5,051.5	8,010.6
White Birch	254,659.9	151,642.8	1,560.2	3,381.2
Hard Maple	91,096.4	57,507.7	865.6	982.3
Yellow Birch	37,860.6	Profile Area a:	301.0	375.4
Ash	3,111.8	2,143.6	40.7	39.4
Oak	8,399.3	5,822.8	109.4	106.0
Other Hardwoods	45,653.9	31,348.6	590.1	574.7
Total	2,657,388.0	1,539,890.8	23,126.5	32,157.2
Proportion of Ontario:	36.8%	35.7%	36.7%	37.0%

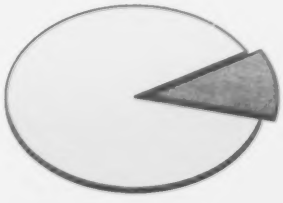
Proportion of Volume by Species



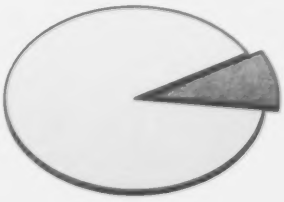
2002 Satellite Imagery



Profile Area as Proportion of Ontario's Area



Profile Forest as Proportion of Ontario's Forest

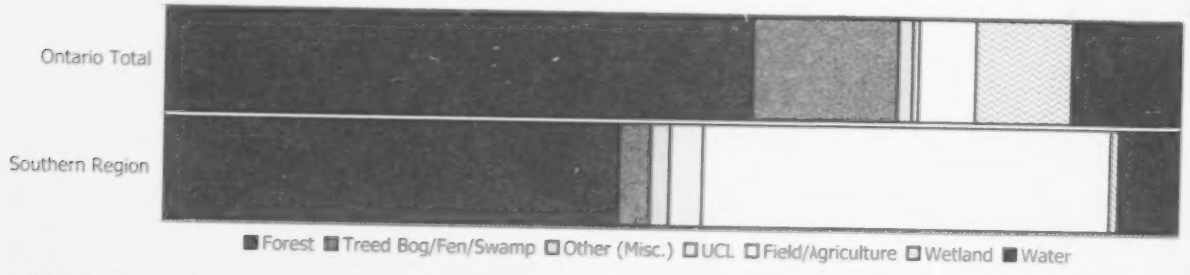


4.4.3 - Geographic Profile - Satellite Data — Administrative Regions - Southern Region

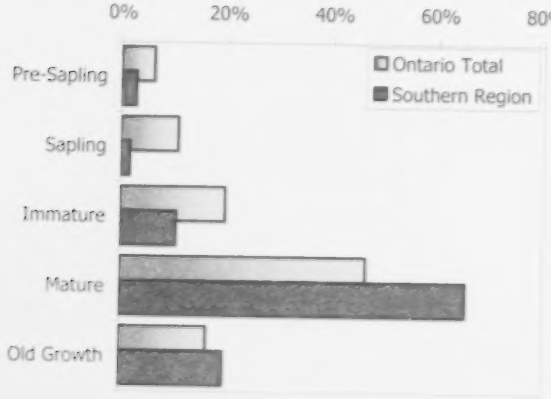
Area in thousands of hectares

Land Class	Crown within AOU	Crown outside AOU	Crown Subtotal	Protected Areas	Other	Total	*Proportion*
Non-forested Land							
Water	422.4	294.4	716.8	59.5	0.0	776.3	6.0%
Wetland	3.7	3.2	6.9	4.9	97.3	109.2	0.8%
Rock	13.6	0.3	14.0	25.4	106.3	145.6	1.1%
Field/Agriculture	3.2	4.0	7.2	5.0	5,211.8	5,224.1	40.4%
UCL	4.8	1.9	6.8	1.2	411.1	419.0	3.2%
Other (Misc.)	0.0	0.2	0.2	0.6	41.9	42.7	0.3%
Other (Unknown/Cloud)	17.3	0.1	17.4	2.4	34.4	54.2	0.4%
Subtotal:	465.2	304.2	769.3	99.0	5,902.8	6,771.1	52.3%
Non-productive Forest							
Swamp	0.0	0.2	0.2	1.7	117.4	119.4	0.9%
Treed Bog & Fen	34.8	1.0	35.8	10.8	241.0	287.6	2.2%
Subtotal:	34.8	1.3	36.0	12.4	358.5	407.0	3.1%
Productive Forest							
Dense Deciduous	381.7	0.7	382.4	73.2	1,229.5	1,685.1	13.0%
Dense Conifer	318.8	1.4	320.3	70.5	614.7	1,005.5	7.8%
Mixed Forest	633.0	0.6	633.6	147.4	1,401.7	2,182.7	16.9%
Sparse Forest	144.7	1.0	145.7	82.3	543.5	771.5	6.0%
Disturbance - Harvest	7.2	0.0	7.2	0.6	37.9	45.7	0.4%
Disturbance - Fire	0.1	0.1	0.2	0.1	32.0	32.2	0.2%
Regenerating Forest	0.0	0.0	0.0	0.1	37.9	38.0	0.3%
Subtotal:	1,485.6	3.9	1,489.4	374.0	3,897.1	5,760.6	44.5%
All Forest:	1,520.4	5.1	1,525.5	386.5	4,255.6	6,167.5	47.7%
Forest Proportion:	**24.7%**	**0.1%**	**24.7%**	**6.3%**	**69.0%**	**100.0%**	
Grand Total:	1,985.5	309.3	2,294.8	485.5	10,158.4	12,938.6	100.0%
Total Proportion:	**15.3%**	**2.4%**	**17.7%**	**3.8%**	**78.5%**	**100.0%**	

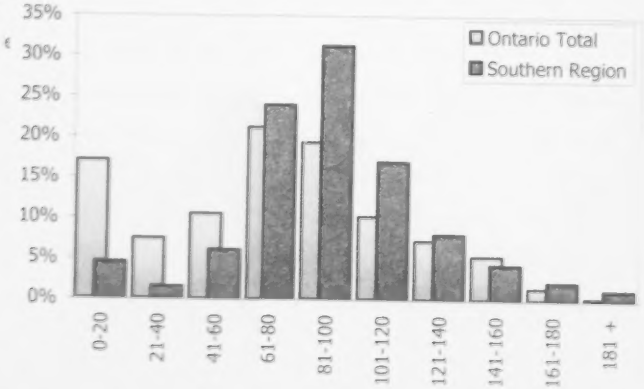
Proportion of Area by Land Class



Seral Stages - Profile Area vs. Provincial Average



Age Class Structure - Profile Area vs. Provincial Average



Productive Forest Area by 20 Year Age Class - Inventoried Regional Area (all ownerships)

Area in thousands of hectares

Age Class	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
0-20	25.6	2.8	41.2	4.1	0.9	31.6	9.7	35.3	151.2
21-40	16.9	0.7	6.2	0.5	2.3	4.9	4.3	14.7	50.4
41-60	31.4	1.9	38.4	2.1	13.1	15.5	34.8	65.1	202.3
61-80	80.8	2.0	123.4	4.5	45.1	86.2	162.5	293.3	797.8
81-100	151.5	5.2	128.4	6.6	48.4	67.6	122.2	512.9	1,042.8
101-120	151.5	1.9	71.8	5.2	23.0	13.9	32.4	266.2	565.9
121-140	40.3	0.0	39.9	3.1	6.5	1.0	7.1	170.5	268.3
141-160	6.8	0.0	20.2	0.9	0.9	0.0	1.6	112.6	143.0
161-180	1.5	0.0	11.6	0.1	0.5	0.0	1.1	57.2	72.0
181 +	0.8	0.0	25.2	0.1	0.2	0.0	0.2	14.4	40.9
Total:	507.0	14.6	506.3	27.1	140.8	220.7	375.9	1,542.2	3,334.7

Productive Forest Area by Seral Stage - Inventoried Regional Area (all ownerships)

Seral Stage	White & Red Pine	Jack Pine	Conifer Upland	Conifer Lowland	Mixedwood	Poplar	White Birch	Tolerant Hardwood	Total
Pre-Sapling	16.3	0.9	21.5	3.7	0.5	17.2	6.0	26.4	92.5
Sapling	9.3	1.8	19.6	0.6	0.4	9.3	2.8	11.1	55.0
Immature	100.3	3.1	68.0	5.4	15.4	17.5	22.5	119.6	351.7
Mature	375.1	7.9	256.1	16.1	103.3	153.2	284.3	984.7	2,180.6
Old Growth	6.1	0.7	141.1	1.3	21.3	23.5	60.5	400.4	654.8
Total:	507.0	14.6	506.3	27.1	140.8	220.7	375.9	1,542.2	3,334.7

Proportion of Profile Area within AOU (all ownerships)

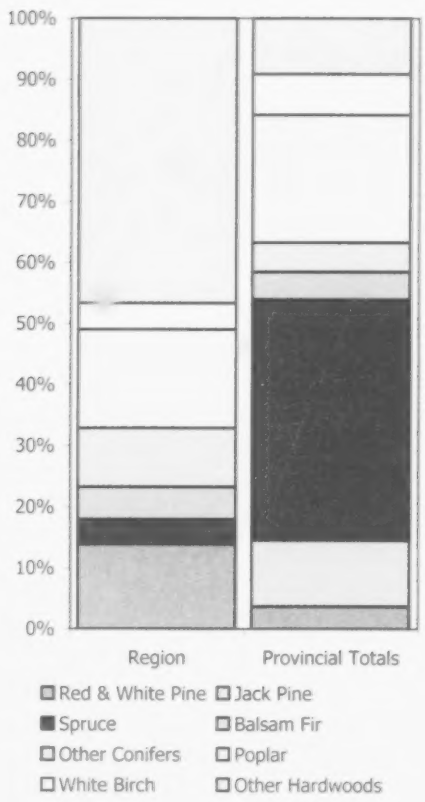
Land Class	Area within AOU Area	Area within AOU Proportion	Area with Digital FRI Area	Area with Digital FRI Proportion
Productive Forest Area:	3,693.3	64.1%	3,334.7	57.9%
Total Area:	4,778.3	36.9%	4,778.3	36.9%

Volume by Tree Species - Estimates for Entire Profile Area

Volume in thousands of cubic metres

Tree Species	Gross Total Volume (GTV)	Net Merch. Volume (NMV)	Current Annual Increment (CAI)	Mean Annual Increment (MAI)
White Pine	113,752.1	75,786.7	925.6	1,264.7
Red Pine	23,744.5	17,546.6	243.5	356.3
Jack Pine	5,611.4	4,121.7	33.8	77.3
Black Spruce	9,620.3	5,802.9	86.7	106.1
White Spruce	25,150.6	16,534.5	246.9	293.5
Balsam Fir	52,409.5	22,873.6	531.3	625.1
Cedar	49,583.6	18,181.8	431.6	545.5
Larch	4,622.5	1,822.0	41.7	52.4
Hemlock	40,683.8	27,959.1	275.1	371.6
Other Conifers	516.5	144.6	14.3	10.2
Poplar	160,419.6	104,233.0	879.4	1,947.6
White Birch	42,392.3	26,269.6	160.2	498.1
Hard Maple	228,187.6	145,539.2	1,974.6	2,332.5
Yellow Birch	29,503.1	Profile Area a:	181.9	258.6
Ash	22,489.8	15,664.1	282.5	278.3
Oak	63,446.3	47,197.6	642.7	704.9
Other Hardwoods	119,109.6	85,782.1	1,297.6	1,367.3
Total	991,243.3	615,459.2	8,249.5	11,090.0
Proportion of Ontario:	**13.7%**	**14.3%**	**13.1%**	**12.7%**

Proportion of Volume by Species



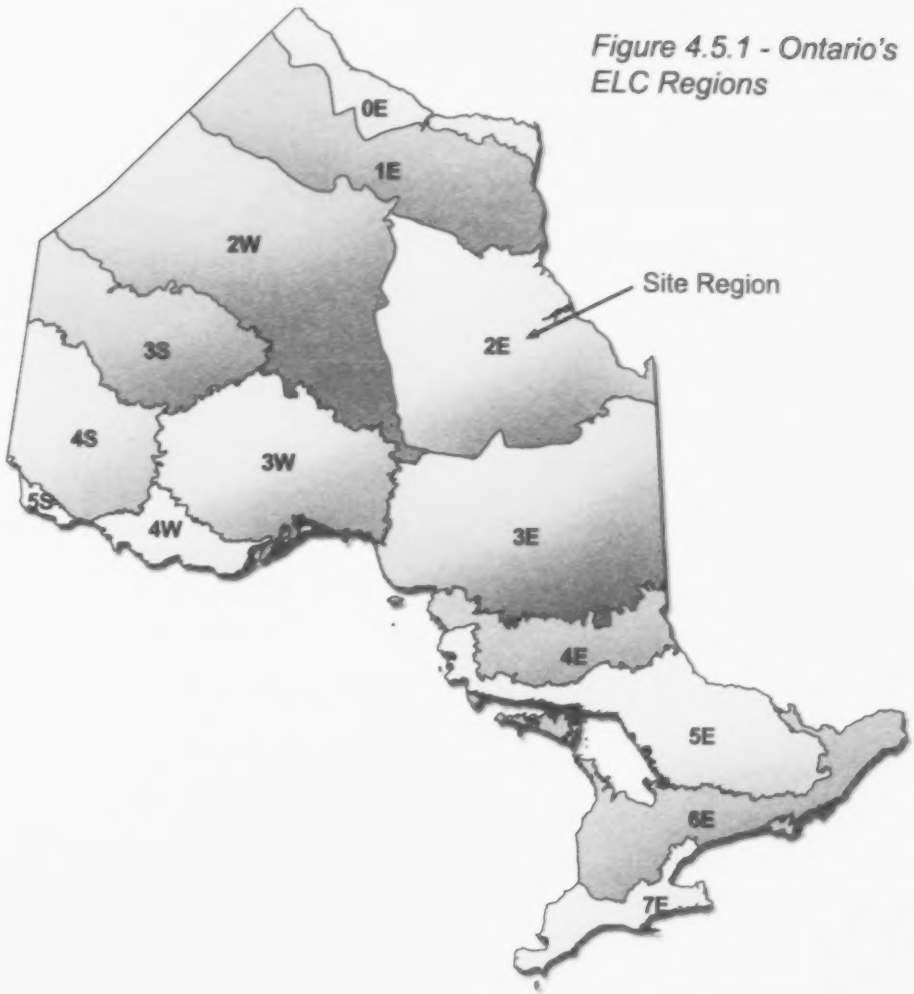
4.5 – Ecological Land Classification (ELC)

The upper levels of Ontario's Ecological Land Classification (ELC) system includes 3 ecozones, 14 ecoregions, further subdivided into 71 ecodistricts. Due to the sheer number of these regions and districts, a standard summary is not available. Rather a set of abbreviated summaries are presented.

Since these districts were digitized to the boundaries of the Great Lakes, water within the Great Lakes is not included in these summaries.

It should be noted that the provincial ELC layer used by the province of Ontario is different from that used by Forestry Canada.

Figure 4.5.1 - Ontario's ELC Regions



4.5.1 - Geographic Summary - Satellite Data — ELC Ecoregions - Land Classes

Area in thousands of hectares

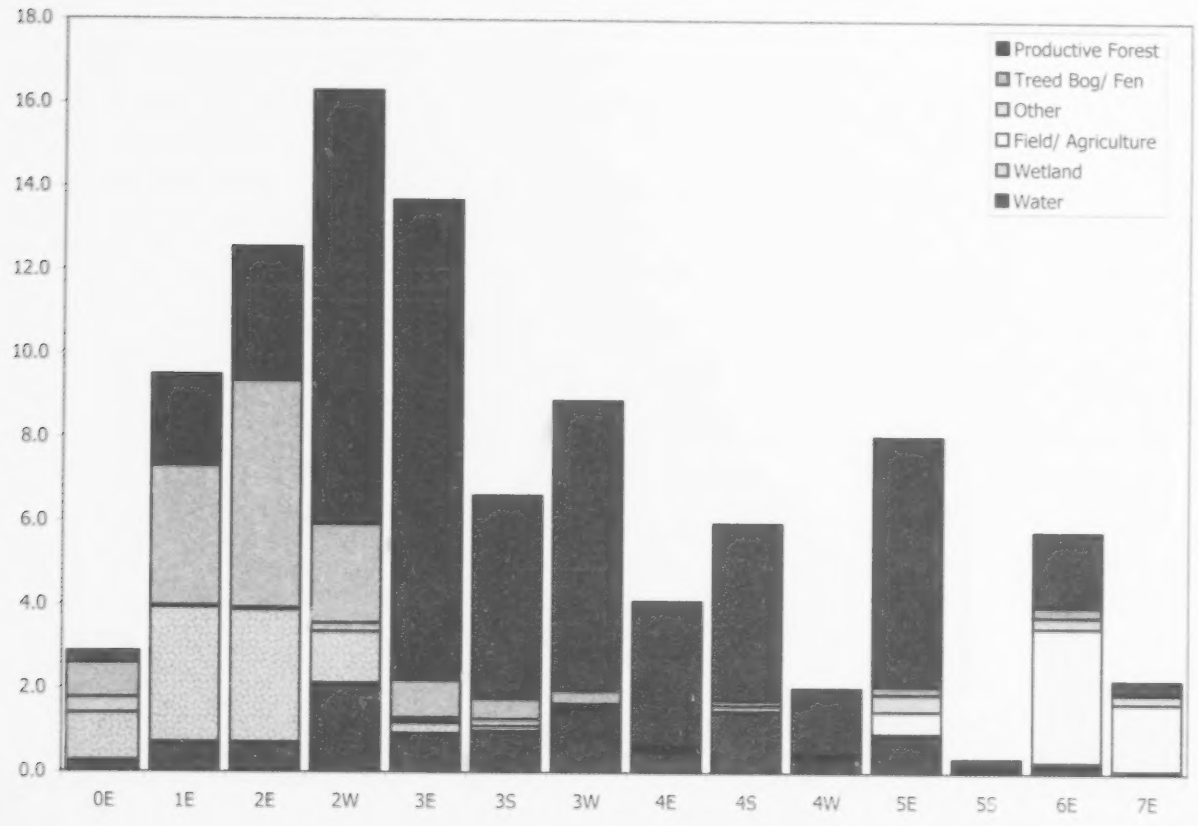
Site Region / Ownership		Water	Wetland	Field/ Agriculture	Other	Treed Bog/ Fen	Productive Forest	Total	*Proportion*
0E	Crown	123.6	529.6	0.0	105.7	445.4	177.9	1,382.3	48.0%
	Parks	141.6	607.8	0.0	261.5	377.6	102.8	1,491.2	51.8%
	Other	0.3	0.7	0.0	0.9	1.3	0.6	3.8	0.1%
	Total	265.5	1,138.2	0.0	368.0	824.3	281.4	2,877.3	100.0%
	Proportion:	9.2%	39.6%	0.0%	12.8%	28.6%	9.8%	100.0%	
1E	Crown	667.2	2,878.4	0.0	28.2	2,939.5	2,098.3	8,611.6	90.7%
	Parks	41.1	338.4	0.0	11.0	405.9	85.3	881.8	9.3%
	Other	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0%
	Total	708.3	3,216.9	0.0	39.2	3,345.5	2,183.6	9,493.5	100.0%
	Proportion:	7.5%	33.9%	0.0%	0.4%	35.2%	23.0%	100.0%	
2E	Crown	682.5	3,144.9	0.0	42.9	5,378.4	3,132.4	12,381.1	98.7%
	Parks	16.2	16.8	0.0	0.2	31.2	42.4	106.7	0.9%
	Other	2.0	9.2	0.0	0.7	30.1	20.2	62.1	0.5%
	Total	700.7	3,170.9	0.0	43.7	5,439.6	3,195.0	12,549.9	100.0%
	Proportion:	5.6%	25.3%	0.0%	0.3%	43.3%	25.5%	100.0%	
2W	Crown	1,843.7	1,199.0	0.0	193.3	2,268.6	9,607.1	15,111.6	92.7%
	Parks	222.1	30.0	0.0	7.7	89.0	663.5	1,012.4	6.2%
	Other	55.0	1.2	0.0	5.7	11.5	100.0	173.5	1.1%
	Total	2,120.8	1,230.2	0.0	206.8	2,369.1	10,370.6	16,297.5	100.0%
	Proportion:	13.0%	7.5%	0.0%	1.3%	14.5%	63.6%	100.0%	
3E	Crown	720.0	210.4	2.2	26.7	780.2	9,595.7	11,335.1	82.9%
	Parks	132.3	31.9	0.0	5.8	75.7	815.9	1,061.7	7.8%
	Other	70.0	8.9	38.7	52.5	44.0	1,067.1	1,281.2	9.4%
	Total	922.4	251.2	40.9	84.9	899.9	11,478.7	13,678.0	100.0%
	Proportion:	6.7%	1.8%	0.3%	0.6%	6.6%	83.9%	100.0%	
3S	Crown	879.6	121.4	0.0	162.5	474.5	4,707.6	6,345.7	95.8%
	Parks	94.7	2.0	0.0	0.8	8.0	137.4	242.7	3.7%
	Other	6.7	0.2	0.0	1.3	1.9	25.5	35.6	0.5%
	Total	980.9	123.5	0.0	164.6	484.4	4,870.5	6,624.0	100.0%
	Proportion:	14.8%	1.9%	0.0%	2.5%	7.3%	73.5%	100.0%	
3W	Crown	1,148.6	50.3	0.0	32.0	226.0	5,526.6	6,983.4	78.6%
	Parks	328.3	17.3	0.0	23.9	60.2	1,096.5	1,526.3	17.2%
	Other	38.9	2.6	0.0	6.8	14.9	317.4	380.7	4.3%
	Total	1,515.9	70.1	0.0	62.7	301.1	6,940.5	8,890.4	100.0%
	Proportion:	17.1%	0.8%	0.0%	0.7%	3.4%	78.1%	100.0%	
4E	Crown	344.8	5.5	1.1	15.2	46.8	2,745.3	3,158.6	77.0%
	Parks	128.3	1.7	0.1	4.8	7.3	512.1	654.3	16.0%
	Other	13.6	0.3	61.2	10.0	2.4	202.0	289.5	7.1%
	Total	486.7	7.5	62.4	29.9	56.5	3,459.4	4,102.4	100.0%
	Proportion:	11.9%	0.2%	1.5%	0.7%	1.4%	84.3%	100.0%	
4S	Crown	1,211.5	18.4	1.6	65.3	91.4	3,454.8	4,842.9	81.3%
	Parks	215.3	7.7	0.0	50.9	26.5	544.3	844.6	14.2%
	Other	13.7	1.2	13.1	13.8	5.5	221.7	269.0	4.5%
	Total	1,440.4	27.2	14.7	130.0	123.4	4,220.8	5,956.5	100.0%
	Proportion:	24.2%	0.5%	0.2%	2.2%	2.1%	70.9%	100.0%	
4W	Crown	221.4	2.6	0.3	7.5	29.8	977.1	1,238.7	61.1%
	Parks	124.1	2.0	0.0	7.5	11.0	368.8	513.5	25.3%
	Other	9.4	0.4	8.5	10.3	2.4	244.6	275.6	13.6%
	Total	354.9	5.0	8.8	25.3	43.1	1,590.5	2,027.7	100.0%
	Proportion:	17.5%	0.2%	0.4%	1.2%	2.1%	78.4%	100.0%	

4.5.1 - Geographic Summary - Satellite Data — ELC Ecoregions - Land Classes

Area in thousands of hectares

Site Region / Ownership		Water	Wetland	Field/ Agriculture	Other	Treed Bog/ Fen	Productive Forest	Total	*Proportion*
5E	Crown	466.4	9.6	6.6	109.2	66.7	2,669.7	3,328.1	41.4%
	Parks	107.4	3.6	1.1	67.7	15.2	553.9	748.9	9.3%
	Other	331.6	16.1	528.8	229.3	115.7	2,744.6	3,966.1	49.3%
	Total	905.4	29.3	536.4	406.1	197.7	5,968.2	8,043.1	100.0%
	Proportion:	11.3%	0.4%	6.7%	5.0%	2.5%	74.2%	100.0%	
5S	Crown	40.2	1.8	5.9	0.5	9.0	45.0	102.3	30.4%
	Parks	2.8	3.6	0.1	0.2	5.3	8.9	20.8	6.2%
	Other	1.3	3.2	51.1	2.8	11.9	143.6	213.8	63.5%
	Total	44.3	8.6	57.1	3.5	26.1	197.5	337.0	100.0%
	Proportion:	13.1%	2.5%	16.9%	1.0%	7.7%	58.6%	100.0%	
6E	Crown	13.0	0.9	1.6	2.9	0.9	9.1	28.4	0.5%
	Parks	4.0	1.5	3.0	2.7	2.6	28.6	42.5	0.7%
	Other	164.2	72.7	3,205.6	262.1	248.7	1,741.3	5,694.7	98.8%
	Total	181.2	75.1	3,210.2	267.8	252.2	1,779.0	5,765.5	100.0%
	Proportion:	3.1%	1.3%	55.7%	4.6%	4.4%	30.9%	100.0%	
7E	Crown	18.2	3.0	8.2	3.4	1.1	3.3	37.1	1.7%
	Parks	1.0	1.5	1.3	0.4	0.6	4.2	9.1	0.4%
	Other	30.6	14.2	1,594.2	217.2	19.8	301.7	2,177.8	97.9%
	Total	49.8	18.7	1,603.8	221.0	21.5	309.3	2,224.0	100.0%
	Proportion:	2.2%	0.8%	72.1%	9.9%	1.0%	13.9%	100.0%	

Total Area by Site Region and Satellite Land Class (millions of hectares)



4.5.2 - Geographic Summary - Satellite Data — ELC Ecoregions - Forest Classes

Area in thousands of hectares

Site Region / Ownership	Dense Deciduous	Dense Conifer	Mixed Forest	Sparse Forest	Disturbance Harvest	Disturbance Fire	Regenerating Forest	Total	*Proportion*
0E Crown	1.8	12.6	3.5	109.5	0.0	33.9	16.7	177.9	63.2%
Parks	0.6	21.0	19.8	53.7	0.0	7.3	0.4	102.8	36.5%
Other	0.1	0.0	0.2	0.0	0.0	0.3	0.0	0.6	0.2%
Total	2.5	33.6	23.5	163.1	0.0	41.5	17.1	281.4	100.0%
Proportion:	0.9%	12.0%	8.4%	58.0%	0.0%	14.7%	6.1%	100.0%	
1E Crown	4.2	200.4	188.5	1,438.1	0.0	183.7	83.3	2,098.3	96.1%
Parks	1.1	11.1	6.7	30.9	0.0	33.5	2.0	85.3	3.9%
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Total	5.3	211.6	195.2	1,469.0	0.0	217.2	85.3	2,183.6	100.0%
Proportion:	0.2%	9.7%	8.9%	67.3%	0.0%	9.9%	3.9%	100.0%	
2E Crown	54.7	1,548.1	462.5	934.8	2.4	101.3	28.7	3,132.4	98.0%
Parks	4.6	19.7	9.3	8.8	0.0	0.0	0.0	42.4	1.3%
Other	2.2	11.3	1.6	4.1	0.0	0.9	0.0	20.2	0.6%
Total	61.5	1,579.1	473.5	947.6	2.4	102.2	28.7	3,195.0	100.0%
Proportion:	1.9%	49.4%	14.8%	29.7%	0.1%	3.2%	0.9%	100.0%	
2W Crown	167.7	2,982.0	1,248.2	3,275.4	27.8	1,205.3	700.6	9,607.1	92.6%
Parks	26.0	149.8	107.9	191.0	0.3	106.3	82.3	663.5	6.4%
Other	3.1	30.7	18.6	26.2	1.2	6.8	13.3	100.0	1.0%
Total	196.9	3,162.5	1,374.7	3,492.6	29.3	1,318.4	796.1	10,370.6	100.0%
Proportion:	1.9%	30.5%	13.3%	33.7%	0.3%	12.7%	7.7%	100.0%	
3E Crown	760.9	3,325.7	3,264.0	1,222.9	969.0	53.1	0.0	9,595.7	83.6%
Parks	111.0	286.9	295.6	90.6	17.3	14.5	0.0	815.9	7.1%
Other	118.1	227.8	472.5	164.9	83.9	0.0	0.0	1,067.1	9.3%
Total	990.1	3,840.5	4,032.1	1,478.3	1,070.1	67.6	0.0	11,478.7	100.0%
Proportion:	8.6%	33.5%	35.1%	12.9%	9.3%	0.6%	0.0%	100.0%	
3S Crown	106.9	1,910.3	651.8	1,507.4	67.7	219.1	244.4	4,707.6	96.7%
Parks	2.8	63.6	22.0	39.4	0.1	9.4	0.0	137.4	2.8%
Other	0.9	11.7	4.6	6.8	0.0	0.6	0.7	25.5	0.5%
Total	110.6	1,985.7	678.5	1,553.7	67.8	229.1	245.1	4,870.5	100.0%
Proportion:	2.3%	40.8%	13.9%	31.9%	1.4%	4.7%	5.0%	100.0%	
3W Crown	672.7	1,547.3	1,708.6	1,025.4	474.8	82.3	15.3	5,526.6	79.6%
Parks	67.6	434.0	274.8	251.1	9.0	58.6	1.4	1,096.5	15.8%
Other	60.0	60.9	103.4	66.6	24.9	1.0	0.6	317.4	4.6%
Total	800.3	2,042.3	2,086.8	1,343.1	508.7	142.0	17.2	6,940.5	100.0%
Proportion:	11.5%	29.4%	30.1%	19.4%	7.3%	2.0%	0.2%	100.0%	
4E Crown	482.4	670.9	1,271.2	186.3	133.8	0.6	0.0	2,745.3	79.4%
Parks	142.6	120.9	222.6	22.7	2.7	0.6	0.0	512.1	14.8%
Other	69.2	16.1	89.2	19.9	7.6	0.0	0.0	202.0	5.8%
Total	694.2	807.9	1,583.1	228.9	144.0	1.2	0.0	3,459.4	100.0%
Proportion:	20.1%	23.4%	45.8%	6.6%	4.2%	0.0%	0.0%	100.0%	
4S Crown	85.0	683.9	1,248.5	1,136.3	279.0	13.7	8.2	3,454.8	81.9%
Parks	22.6	146.3	141.9	216.6	1.9	2.2	12.9	544.3	12.9%
Other	13.1	20.6	110.0	64.2	13.6	0.0	0.1	221.7	5.3%
Total	120.7	850.9	1,500.4	1,417.2	294.4	15.9	21.3	4,220.8	100.0%
Proportion:	2.9%	20.2%	35.5%	33.6%	7.0%	0.4%	0.5%	100.0%	
4W Crown	135.0	151.5	396.3	229.8	64.2	0.4	0.0	977.1	61.4%
Parks	22.2	74.5	191.0	76.1	0.7	4.3	0.0	368.8	23.2%
Other	57.9	7.8	85.5	86.2	7.2	0.0	0.0	244.6	15.4%
Total	215.1	233.8	672.8	392.1	72.0	4.6	0.0	1,590.5	100.0%
Proportion:	13.5%	14.7%	42.3%	24.7%	4.5%	0.3%	0.0%	100.0%	

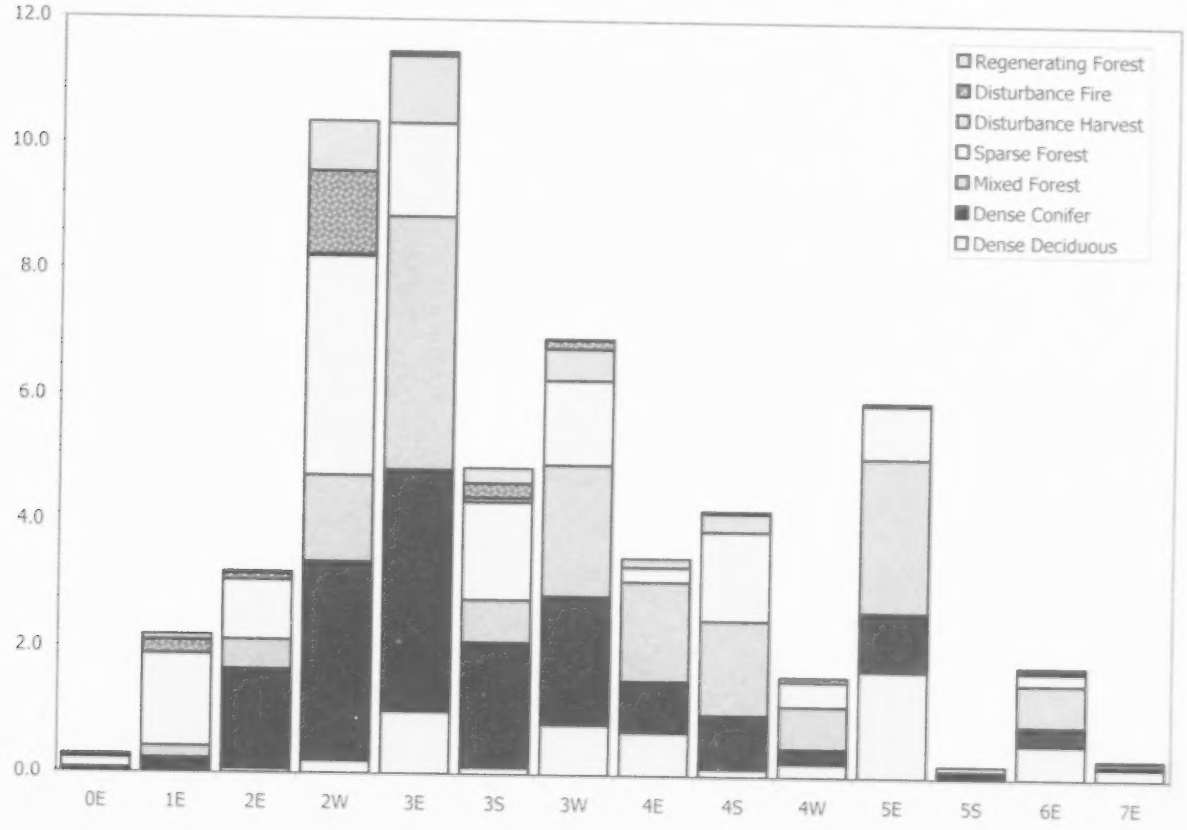
4.5.2 - Geographic Summary - Satellite Data

ELC Ecoregions - Forest Classes

Area in thousands of hectares

Site Region / Ownership		Dense Deciduous	Dense Conifer	Mixed Forest	Sparse Forest	Disturbance Harvest	Disturbance Fire	Regenerating Forest	Total	*Proportion*
5E	Crown	753.3	468.7	1,158.3	266.8	22.3	0.2	0.1	2,669.7	44.7%
	Parks	115.2	83.4	230.1	124.3	0.9	0.0	0.0	553.9	9.3%
	Other	827.9	372.7	1,065.5	457.5	20.5	0.3	0.3	2,744.6	46.0%
	Total	1,696.4	924.8	2,453.9	848.5	43.7	0.5	0.3	5,968.2	100.0%
	Proportion:	**28.4%**	**15.5%**	**41.1%**	**14.2%**	**0.7%**	**0.0%**	**0.0%**	**100.0%**	
5S	Crown	8.2	9.4	12.7	13.8	0.9	0.0	0.0	45.0	22.8%
	Parks	1.8	2.9	3.0	1.2	0.0	0.0	0.0	8.9	4.5%
	Other	37.0	16.7	27.5	61.6	0.8	0.0	0.0	143.6	72.7%
	Total	47.0	29.0	43.2	76.6	1.7	0.0	0.0	197.5	100.0%
	Proportion:	**23.8%**	**14.7%**	**21.9%**	**38.8%**	**0.8%**	**0.0%**	**0.0%**	**100.0%**	
6E	Crown	1.5	1.5	2.8	3.2	0.1	0.1	0.1	9.1	0.5%
	Parks	4.4	11.5	9.2	3.3	0.1	0.1	0.0	28.6	1.6%
	Other	539.1	274.9	650.1	190.6	26.2	28.5	31.9	1,741.3	97.9%
	Total	545.0	287.8	662.1	197.1	26.4	28.6	32.0	1,779.0	100.0%
	Proportion:	**30.6%**	**16.2%**	**37.2%**	**11.1%**	**1.5%**	**1.6%**	**1.8%**	**100.0%**	
7E	Crown	0.5	1.4	0.3	0.9	0.1	0.0	0.1	3.3	1.1%
	Parks	2.3	0.9	0.7	0.2	0.1	0.0	0.0	4.2	1.4%
	Other	183.5	18.4	28.3	57.6	4.1	3.7	6.1	301.7	97.6%
	Total	186.3	20.7	29.3	58.7	4.2	3.8	6.2	309.3	100.0%
	Proportion:	60.2%	6.7%	9.5%	19.0%	1.4%	1.2%	2.0%	100.0%	

Total Area by Site Region and Satellite Forest Class (millions of hectares)



5 – Tree Species Distribution

In Chapter 3, the Forest Resources Inventory (FRI) is summarized by aggregating stands by forest type. In this chapter, tree species distribution, as well as growing stock volumes and growth are measured from a sub-stand level, by species, independent of working group or forest type. For example, the black spruce component within the lowland conifer forest type is summarized with the black spruce component of upland conifer, mixedwood, and anywhere else it may occur.

Tree species occurrence is broken down by stand component (proportion of stand), as well as growing stock volumes and growth. Many species in Ontario occur in a wide variety of stands, in very small amounts. For example, within the AOU, white pine can be found in concentrations of 1% or more on 3.4 million hectares of forest, but as a working group (dominant species) is only found on 787,000 hectares.

The context for this chapter's area and volume summaries is, for the most part, the AOU. The legend key on the next page highlights where data is derived from and how it should be interpreted. Each tree species distribution map attempts to cover the entire province. Utilizing satellite imagery, coupled with a sampling of available FRI, the tree species maps extrapolate relative tree species occurrence north of the inventory limit. The reliability of these maps varies by species, and some allowances in interpretation are necessary. The maps for black spruce and jack pine, which make up the bulk of the forest north of the inventory limit, are relatively reliable. Poplar and white birch share a satellite class, and are somewhat less reliable.

The first map, 5.1.1 – All Tree Species, is represented differently from the other maps in this chapter. This map shows the relative occurrence of forest based on growing stock volume, rather than

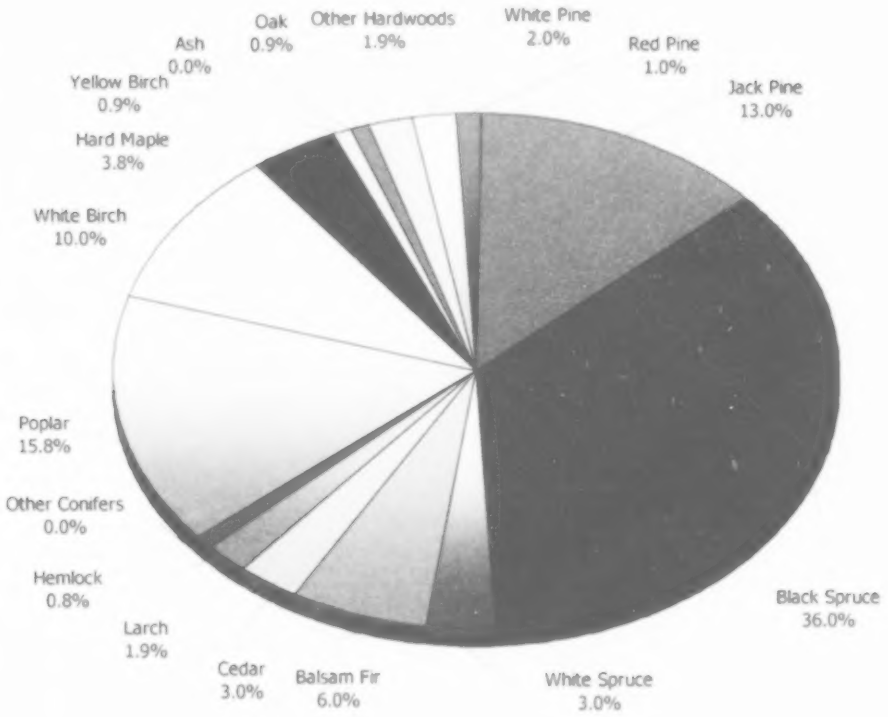
Closeup of Larch

occurrence. The subsequent species maps relate to this map in terms of amount of forest, but calculate occurrence based on stand proportion for forested land only. Without this shift in mapping, or concentration of data, southern species such as cherry or beech do not register, because of the low concentration of forested land.

For example, an area in southwestern Ontario that is 95% agriculture and field, with 5% forest made up of 80% hard maple and 20% beech would be represented as a high concentration of hard maple (dark green) and a moderate to low concentration of beech (light green). Without the adjustment, the entire area would be light gray (indicative of agricultural land), registering no species.

The scale is also species dependent, ranging from the highest concentration of a species within a given area to the lowest. In the case of black spruce, which is commonly found in pure stands over large areas, this scale would be 0-100%, with 100% being coloured dark green. In the case of basswood, which is rarely a working group, and even less common in high concentrations over a wide area, this scale would be approximately 0-30%. Since 30% is the highest large area concentration of basswood found in the provincial summary, that area would be classed as "High" and coloured dark green. This mapping can be tied to the relative amount of growing stock found of species in the growing stock summaries.

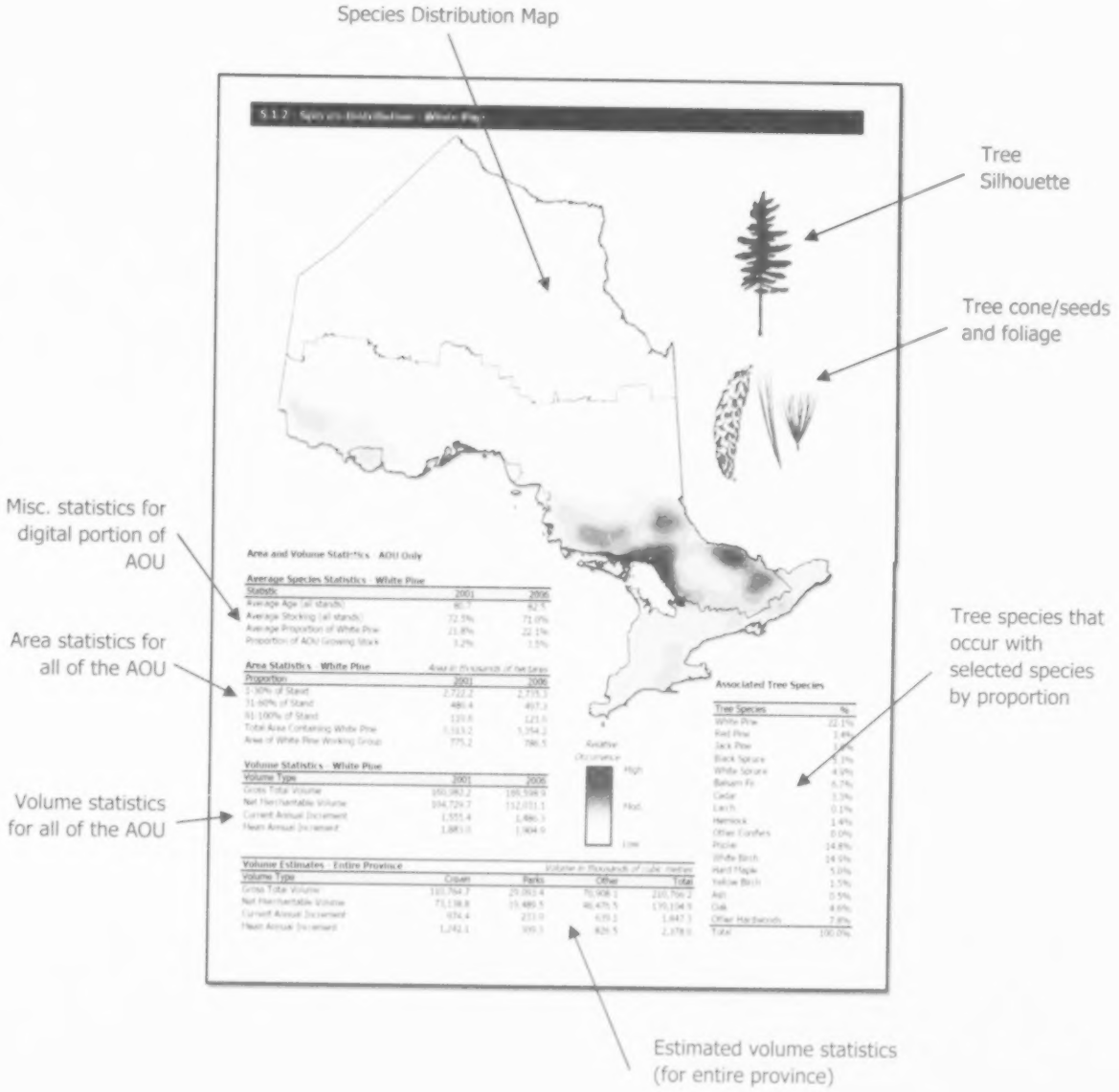
Figure 5.1.1 – Proportion of Provincial Growing Stock by Species



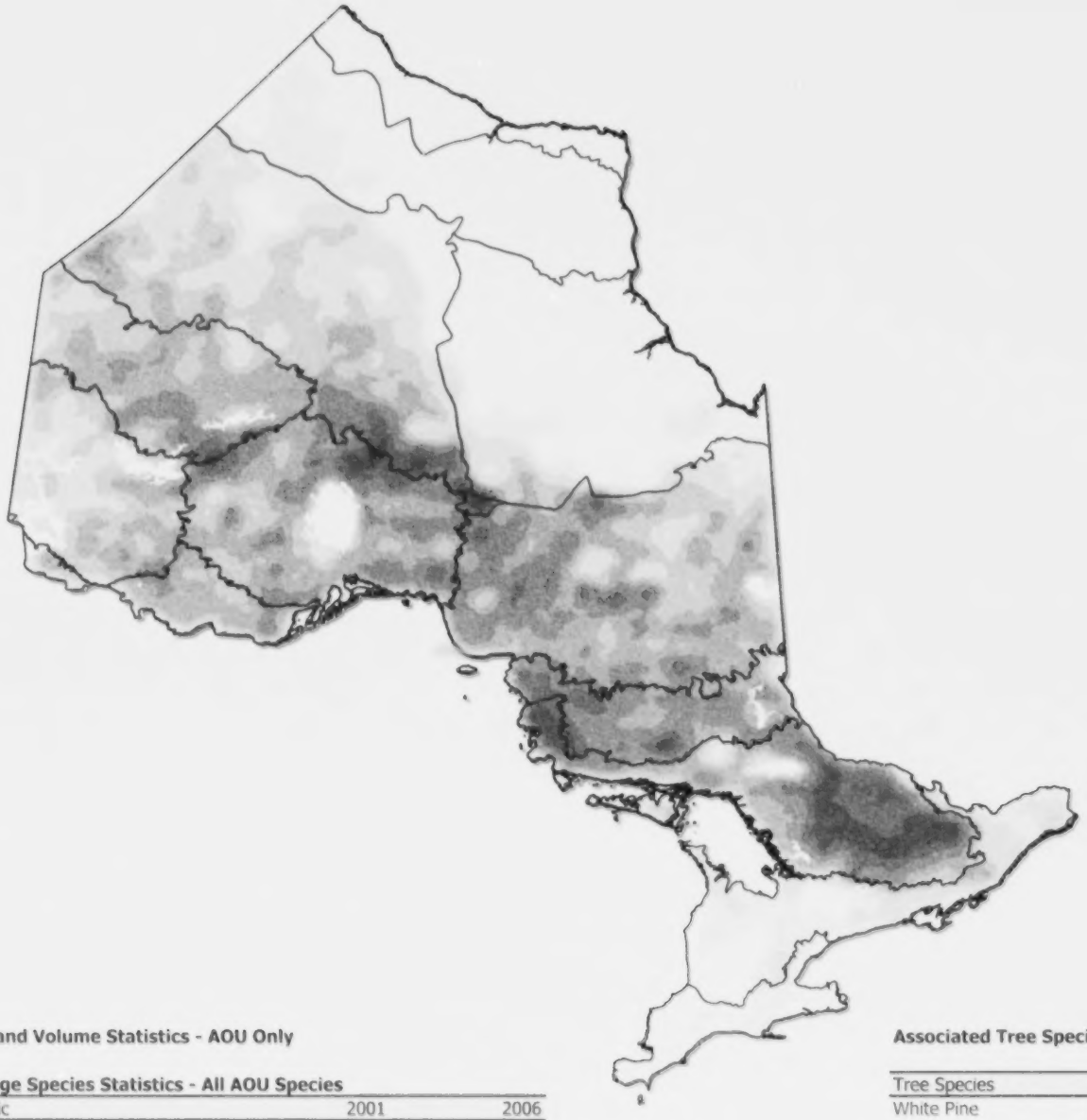
5.1 - Species Distribution Legend Key

Each of the selected species has a standard set of information derived from various sources of information. Those species that highlight southern Ontario only contain the same information in a slightly altered format to fit the map. Several species do not have working group numbers, as they are not normally classed as working groups in the inventory (n/a). Some species volumes were not calculated in 2001, and have an "n/a" listing as well.

The individual species distribution maps depict area and volume information for all stands in which the selected species occurs regardless of working group. The only exception is where the individual working group area is provided.


Species Distribution Map
Tree Silhouette
Tree cone/seeds and foliage
Misc. statistics for digital portion of AOU
Area statistics for all of the AOU
Volume statistics for all of the AOU
Tree species that occur with selected species by proportion
Estimated volume statistics (for entire province)

5.1.1 - Species Distribution - All Species



Area and Volume Statistics - AOU Only

Average Species Statistics - All AOU Species

Statistic	2001	2006
Average Age (all stands)	77.8	75.5
Average Stocking (all stands)	69.1%	67.0%

Volume Statistics - All AOU Growing Stock

Volume Type	2001	2006
Gross Total Volume	4,779,295.3	4,780,354.2
Net Merchantable Volume	2,848,629.4	2,863,264.4
Current Annual Increment	44,349.5	42,648.9
Mean Annual Increment	54,725.1	58,855.9

Volume Estimates - Entire Province

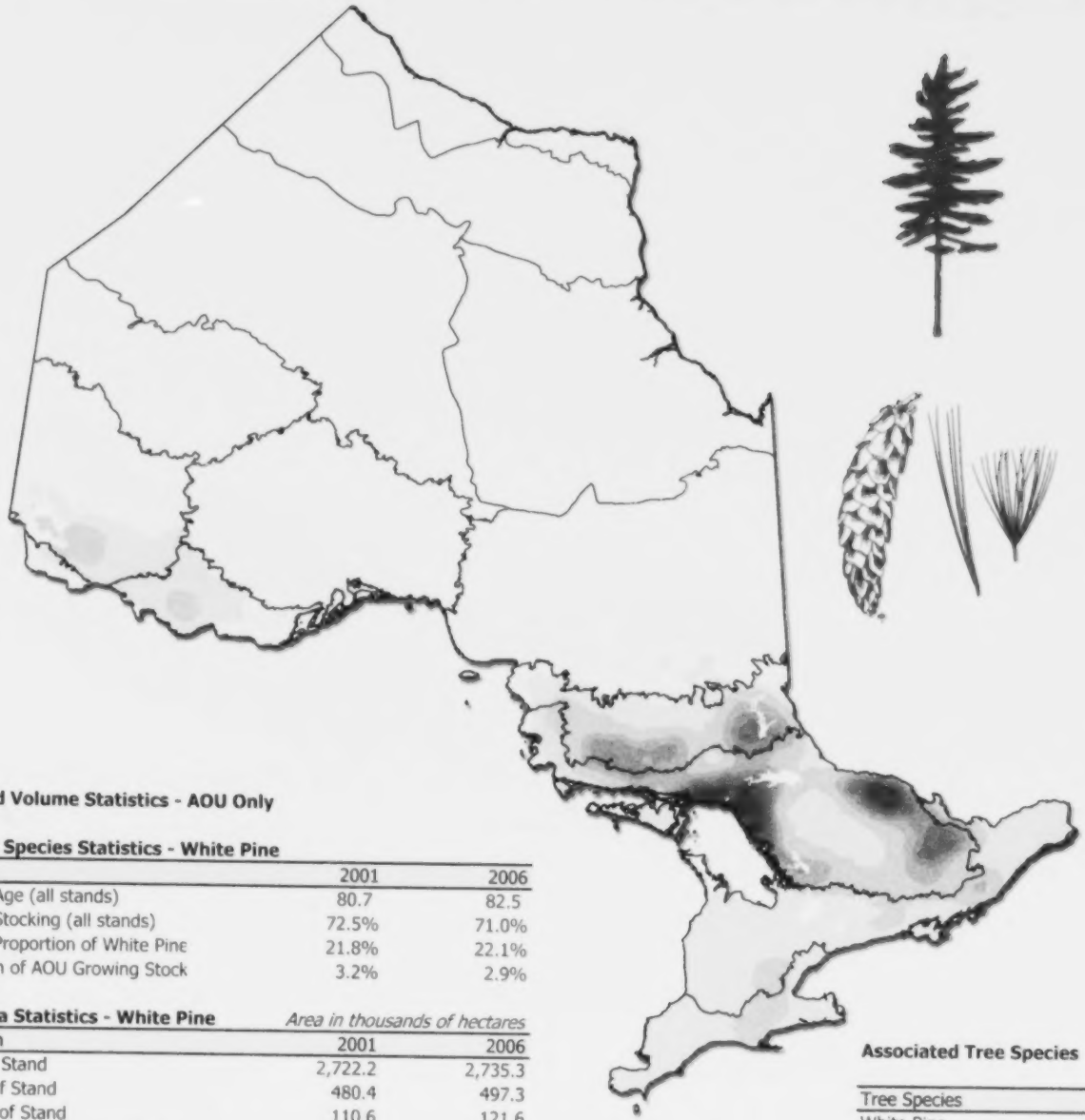
Volume in thousands of cubic metres

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	5,437,432.2	701,049.1	1,074,785.5	7,213,266.8
Net Merchantable Volume	3,216,407.1	421,459.5	666,243.8	4,304,110.3
Current Annual Increment	46,855.4	5,673.5	10,404.4	62,933.3
Mean Annual Increment	65,522.8	8,237.5	13,181.8	86,942.1

Associated Tree Species

Tree Species	%
White Pine	2.0%
Red Pine	1.0%
Jack Pine	13.0%
Black Spruce	36.0%
White Spruce	3.0%
Balsam Fir	6.0%
Cedar	3.0%
Larch	1.9%
Hemlock	0.8%
Other Conifers	0.0%
Poplar	15.8%
White Birch	10.0%
Hard Maple	3.8%
Yellow Birch	0.9%
Ash	0.0%
Oak	0.9%
Other Hardwoods	1.9%
Total	100.0%

5.1.2 - Species Distribution - White Pine



Area and Volume Statistics - AOU Only

Average Species Statistics - White Pine

Statistic	2001	2006
Average Age (all stands)	80.7	82.5
Average Stocking (all stands)	72.5%	71.0%
Average Proportion of White Pine	21.8%	22.1%
Proportion of AOU Growing Stock	3.2%	2.9%

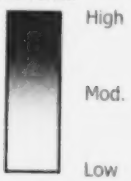
AOU Area Statistics - White Pine *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	2,722.2	2,735.3
31-60% of Stand	480.4	497.3
61-100% of Stand	110.6	121.6
Total Area Containing White Pine	3,313.2	3,354.2
Area of White Pine Working Group	775.2	786.5

AOU Volume Statistics - White Pine *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	160,982.2	169,598.9
Net Merchantable Volume	104,729.7	112,031.1
Current Annual Increment	1,555.4	1,486.3
Mean Annual Increment	1,883.0	1,904.9

Relative Occurrence



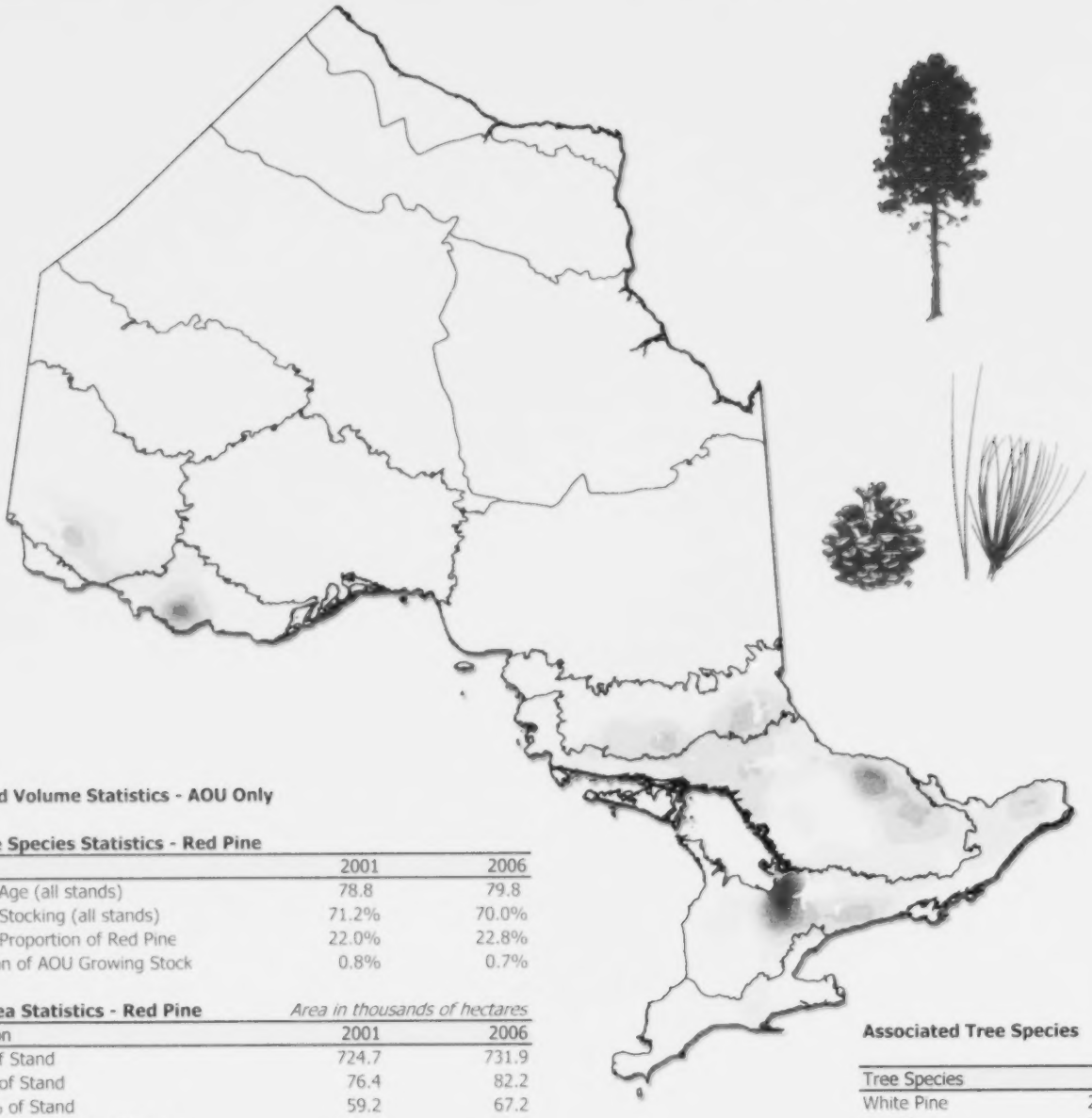
Associated Tree Species

Tree Species	%
White Pine	22.1%
Red Pine	3.4%
Jack Pine	3.8%
Black Spruce	5.3%
White Spruce	4.9%
Balsam Fir	6.7%
Cedar	3.3%
Larch	0.1%
Hemlock	1.4%
Other Conifers	0.0%
Poplar	14.8%
White Birch	14.9%
Hard Maple	5.0%
Yellow Birch	1.5%
Ash	0.5%
Oak	4.6%
Other Hardwoods	7.8%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	110,764.7	29,093.4	70,908.1	210,766.2
Net Merchantable Volume	73,138.8	19,489.5	46,476.5	139,104.9
Current Annual Increment	974.4	233.9	639.1	1,847.3
Mean Annual Increment	1,242.1	309.3	826.5	2,378.0

5.1.2 - Species Distribution - Red Pine



Area and Volume Statistics - AOU Only

Average Species Statistics - Red Pine

Statistic	2001	2006
Average Age (all stands)	78.8	79.8
Average Stocking (all stands)	71.2%	70.0%
Average Proportion of Red Pine	22.0%	22.8%
Proportion of AOU Growing Stock	0.8%	0.7%

AOU Area Statistics - Red Pine *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	724.7	731.9
31-60% of Stand	76.4	82.2
61-100% of Stand	59.2	67.2
Total Area Containing Red Pine	860.3	881.3
Area of Red Pine Working Group	148.5	163.7

AOU Volume Statistics - Red Pine *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	40,296.6	43,108.6
Net Merchantable Volume	29,724.0	31,793.5
Current Annual Increment	394.8	401.7
Mean Annual Increment	584.9	619.0

Relative Occurrence

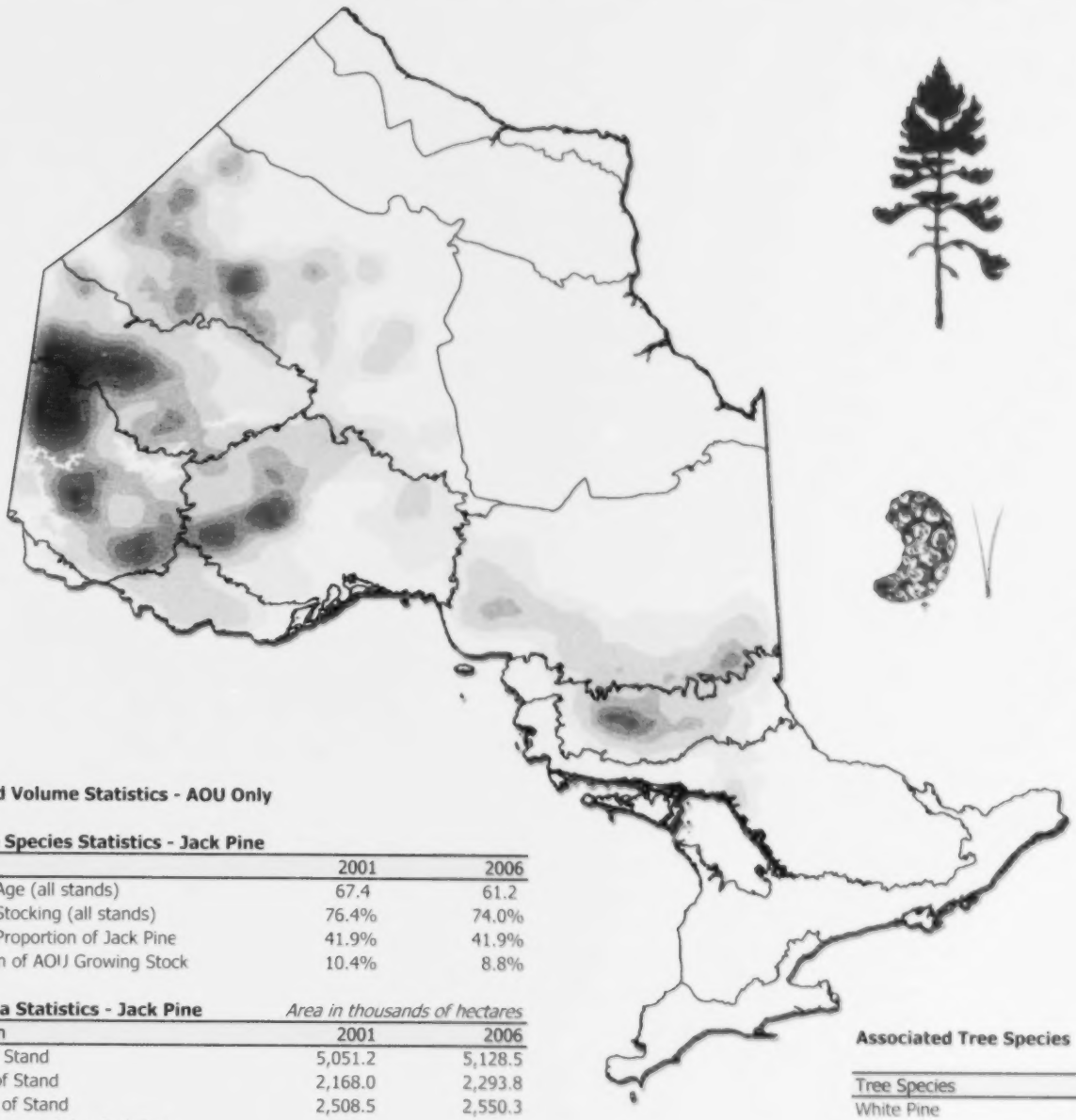
Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	29,254.8	6,892.5	16,493.1	52,640.4
Net Merchantable Volume	21,572.8	5,235.9	11,984.7	38,793.4
Current Annual Increment	252.7	36.1	211.5	500.3
Mean Annual Increment	410.3	77.9	274.4	762.6

Associated Tree Species

Tree Species	%
White Pine	20.7%
Red Pine	22.8%
Jack Pine	6.5%
Black Spruce	4.7%
White Spruce	4.5%
Balsam Fir	4.5%
Cedar	1.7%
Larch	0.0%
Hemlock	0.4%
Other Conifers	0.1%
Poplar	16.0%
White Birch	11.3%
Hard Maple	1.1%
Yellow Birch	0.2%
Ash	0.2%
Oak	1.9%
Other Hardwoods	3.5%
Total	100.0%

5.1.2 - Species Distribution - Jack Pine



Area and Volume Statistics - AOU Only

Average Species Statistics - Jack Pine

Statistic	2001	2006
Average Age (all stands)	67.4	61.2
Average Stocking (all stands)	76.4%	74.0%
Average Proportion of Jack Pine	41.9%	41.9%
Proportion of AOU Growing Stock	10.4%	8.8%

AOU Area Statistics - Jack Pine *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	5,051.2	5,128.5
31-60% of Stand	2,168.0	2,293.8
61-100% of Stand	2,508.5	2,550.3
Total Area Containing Jack Pine	9,727.7	9,972.6
Area of Jack Pine Working Group	4,576.8	4,652.7

AOU Volume Statistics - Jack Pine *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	518,686.4	515,616.0
Net Merchantable Volume	367,255.1	355,836.8
Current Annual Increment	3,792.9	4,633.1
Mean Annual Increment	8,244.2	8,521.8

Relative Occurrence

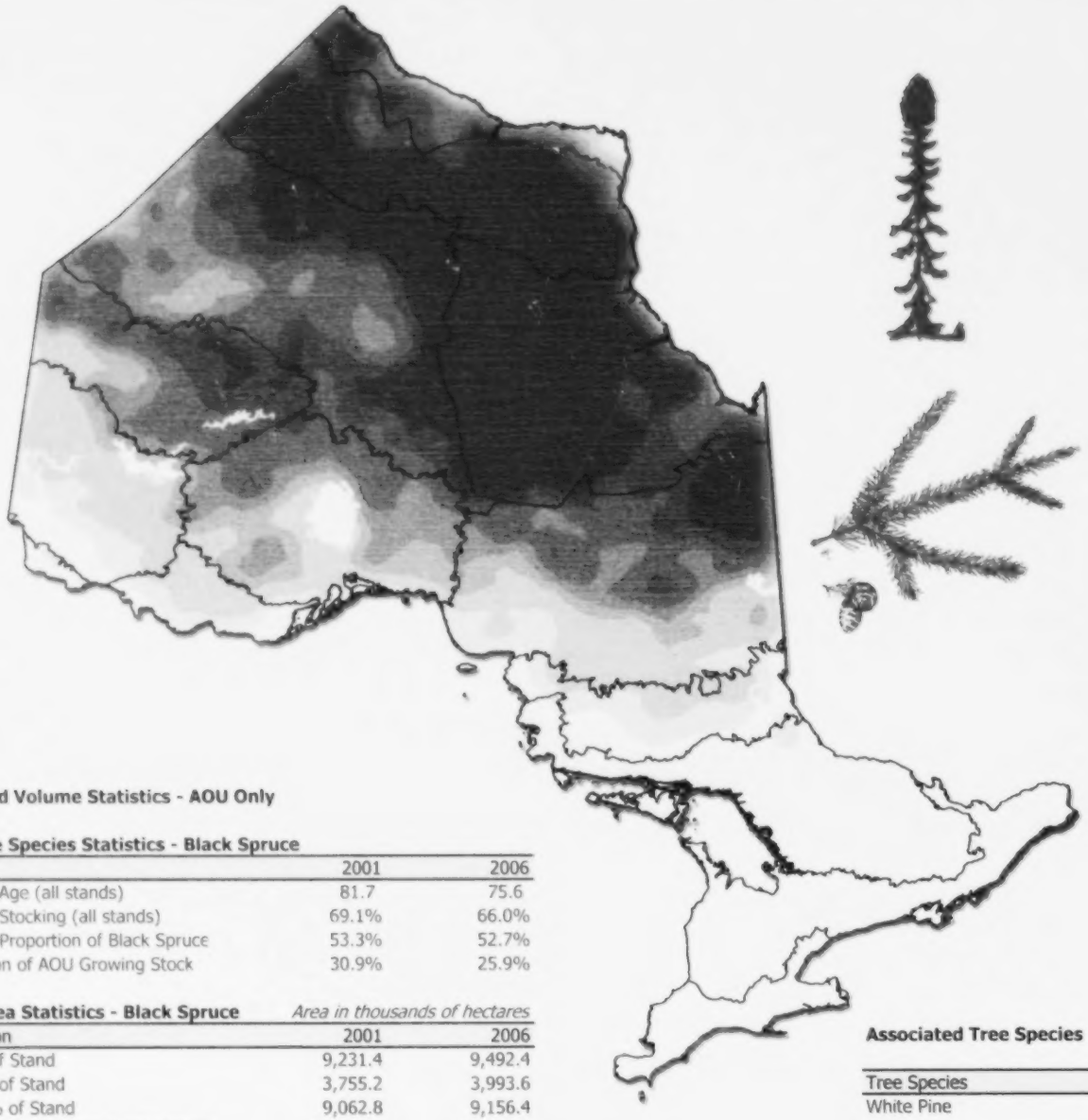
Associated Tree Species

Tree Species	%
White Pine	0.9%
Red Pine	0.4%
Jack Pine	41.9%
Black Spruce	26.0%
White Spruce	1.5%
Balsam Fir	2.6%
Cedar	0.3%
Larch	0.2%
Hemlock	0.0%
Other Conifers	0.0%
Poplar	17.2%
White Birch	8.5%
Hard Maple	0.0%
Yellow Birch	0.0%
Ash	0.0%
Oak	0.1%
Other Hardwoods	0.4%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	684,158.8	78,237.1	22,653.5	785,049.4
Net Merchantable Volume	469,269.6	54,624.1	16,369.8	540,263.5
Current Annual Increment	6,187.2	672.4	188.8	7,048.4
Mean Annual Increment	11,266.0	1,231.2	354.7	12,851.9

5.1.2 - Species Distribution - Black Spruce



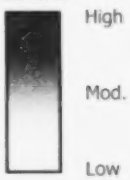
Area and Volume Statistics - AOU Only

Average Species Statistics - Black Spruce		
Statistic	2001	2006
Average Age (all stands)	81.7	75.6
Average Stocking (all stands)	69.1%	66.0%
Average Proportion of Black Spruce	53.3%	52.7%
Proportion of AOU Growing Stock	30.9%	25.9%

AOU Area Statistics - Black Spruce	*Area in thousands of hectares*	
Proportion	2001	2006
1-30% of Stand	9,231.4	9,492.4
31-60% of Stand	3,755.2	3,993.6
61-100% of Stand	9,062.8	9,156.4
Total Area Containing Black Spruce	22,049.5	22,642.4
Area of Black Spruce Working Group	12,890.7	12,904.5

AOU Volume Statistics - Black Spruce	*Volume in thousands of cubic metres*	
Volume Type	2001	2006
Gross Total Volume	1,538,797.3	1,522,646.0
Net Merchantable Volume	887,936.3	882,034.3
Current Annual Increment	13,788.4	13,163.9
Mean Annual Increment	16,318.3	15,866.2

Relative Occurrence

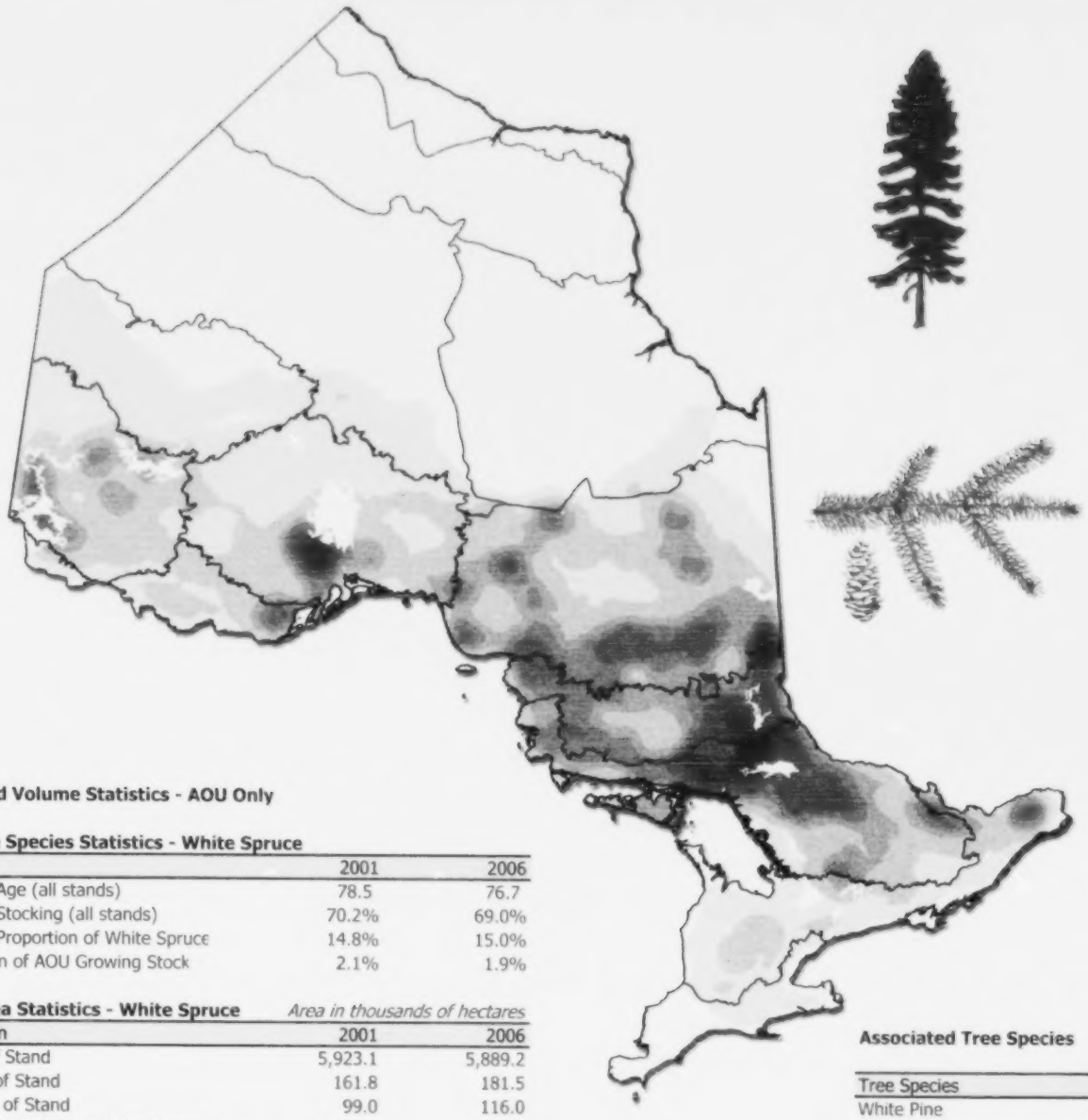


Associated Tree Species

Tree Species	%
White Pine	0.7%
Red Pine	0.2%
Jack Pine	12.4%
Black Spruce	52.7%
White Spruce	1.9%
Balsam Fir	5.2%
Cedar	2.4%
Larch	2.1%
Hemlock	0.0%
Other Conifers	0.0%
Poplar	12.7%
White Birch	9.1%
Hard Maple	0.1%
Yellow Birch	0.1%
Ash	0.1%
Oak	0.0%
Other Hardwoods	0.3%
Total	100.0%

Volume Estimates - Entire Province			*Volume in thousands of cubic metres*	
Volume Type	Crown	Parks	Other	Total
Gross Total Volume	2,356,200.6	249,000.6	94,687.4	2,699,888.6
Net Merchantable Volume	1,371,898.1	146,113.7	52,843.5	1,570,855.2
Current Annual Increment	19,207.2	2,007.5	903.8	22,118.5
Mean Annual Increment	23,923.3	2,524.5	1,023.2	27,471.0

5.1.2 - Species Distribution - White Spruce



Area and Volume Statistics - AOU Only

Average Species Statistics - White Spruce

Statistic	2001	2006
Average Age (all stands)	78.5	76.7
Average Stocking (all stands)	70.2%	69.0%
Average Proportion of White Spruce	14.8%	15.0%
Proportion of AOU Growing Stock	2.1%	1.9%

AOU Area Statistics - White Spruce *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	5,923.1	5,889.2
31-60% of Stand	161.8	181.5
61-100% of Stand	99.0	116.0
Total Area Containing White Spruce	6,183.9	6,186.6
Area of White Spruce Working Group	302.4	325.0

AOU Volume Statistics - White Spruce *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	106,401.5	111,072.8
Net Merchantable Volume	60,953.7	65,544.2
Current Annual Increment	1,425.5	1,404.8
Mean Annual Increment	1,360.8	1,385.4

Relative Occurrence

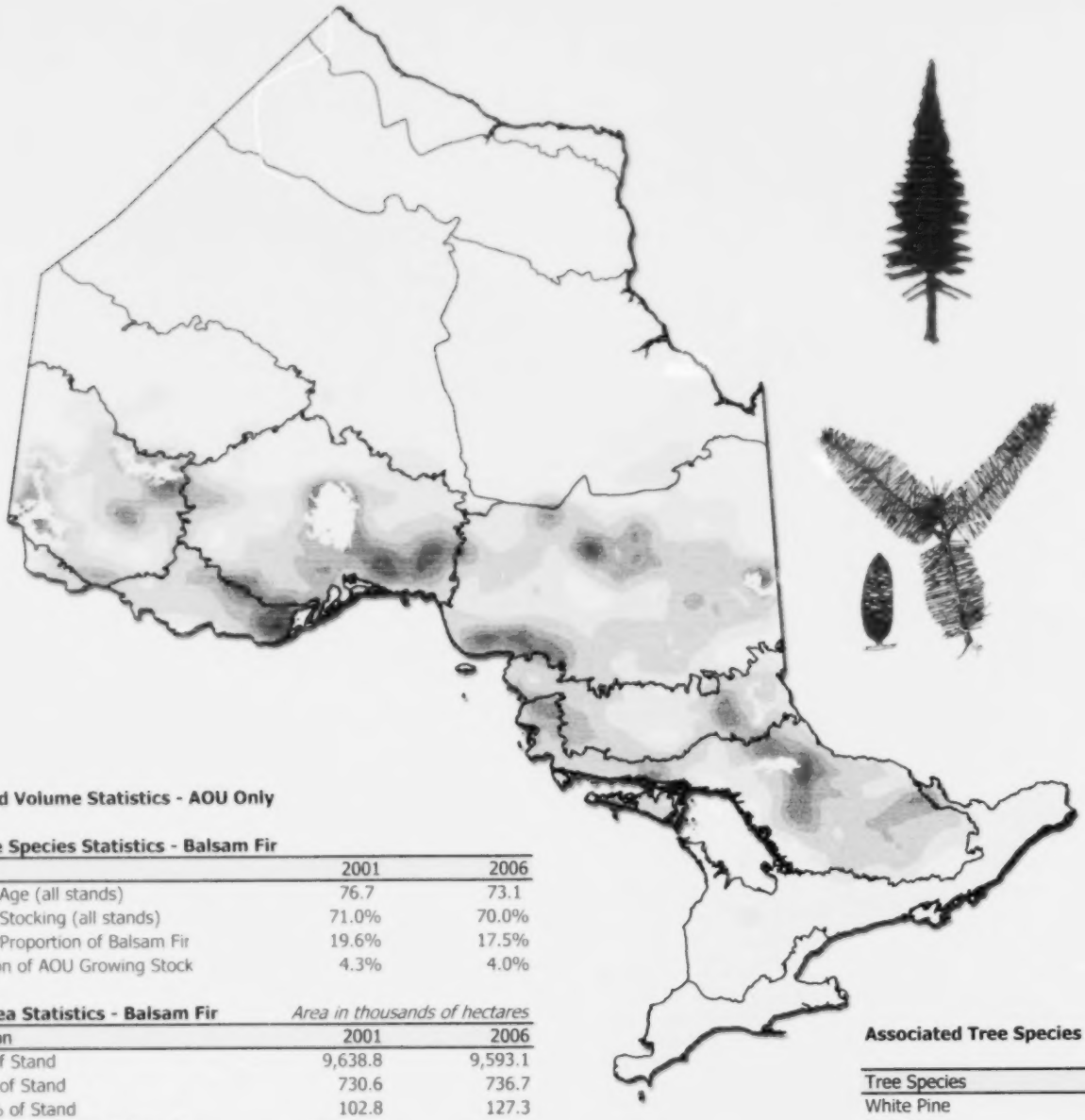
Associated Tree Species

Tree Species	%
White Pine	4.3%
Red Pine	0.8%
Jack Pine	3.9%
Black Spruce	14.0%
White Spruce	15.0%
Balsam Fir	10.8%
Cedar	3.4%
Larch	0.2%
Hemlock	0.4%
Other Conifers	0.0%
Poplar	20.0%
White Birch	17.9%
Hard Maple	3.2%
Yellow Birch	1.7%
Ash	0.4%
Oak	0.5%
Other Hardwoods	3.3%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	97,825.2	15,124.2	31,035.5	143,984.9
Net Merchantable Volume	58,634.5	9,042.3	18,413.2	86,089.9
Current Annual Increment	1,247.0	176.5	386.0	1,809.5
Mean Annual Increment	1,220.7	179.6	396.3	1,796.6

5.1.2 - Species Distribution - Balsam Fir



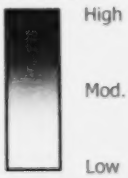
Area and Volume Statistics - AOU Only

Average Species Statistics - Balsam Fir		
Statistic	2001	2006
Average Age (all stands)	76.7	73.1
Average Stocking (all stands)	71.0%	70.0%
Average Proportion of Balsam Fir	19.6%	17.5%
Proportion of AOU Growing Stock	4.3%	4.0%

AOU Area Statistics - Balsam Fir	*Area in thousands of hectares*	
Proportion	2001	2006
1-30% of Stand	9,638.8	9,593.1
31-60% of Stand	730.6	736.7
61-100% of Stand	102.8	127.3
Total Area Containing Balsam Fir	10,472.3	10,457.1
Area of Balsam Fir Working Group	1,365.1	921.8

AOU Volume Statistics - Balsam Fir	*Volume in thousands of cubic metres*	
Volume Type	2001	2006
Gross Total Volume	212,426.6	233,841.2
Net Merchantable Volume	78,635.9	89,071.0
Current Annual Increment	3,182.6	3,263.5
Mean Annual Increment	2,884.6	3,091.4

Relative Occurrence

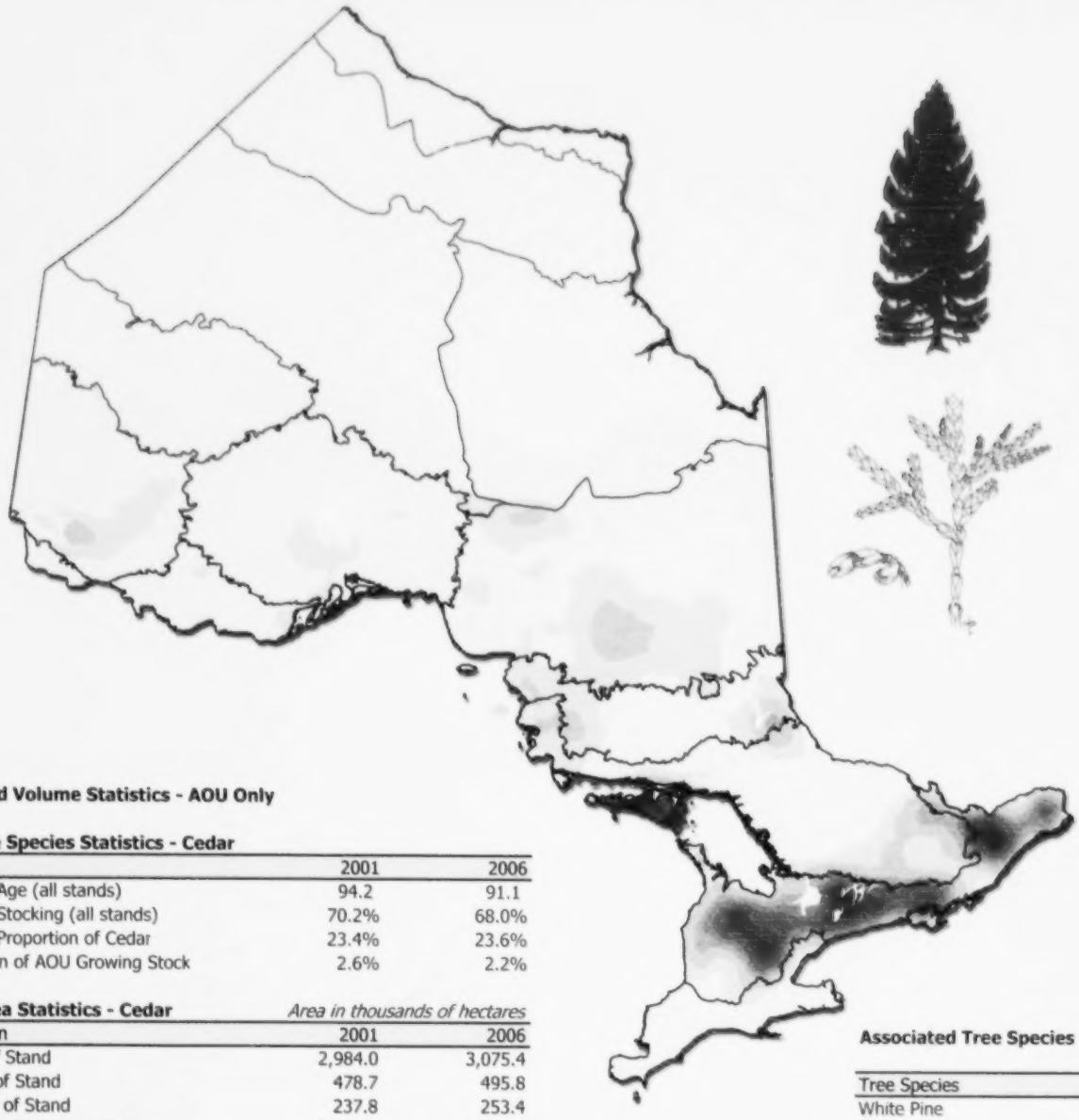


Associated Tree Species

Tree Species	%
White Pine	2.6%
Red Pine	0.4%
Jack Pine	4.2%
Black Spruce	23.0%
White Spruce	4.9%
Balsam Fir	17.5%
Cedar	3.3%
Larch	0.6%
Hemlock	0.5%
Other Conifers	0.0%
Poplar	19.2%
White Birch	15.9%
Hard Maple	2.8%
Yellow Birch	1.2%
Ash	0.5%
Oak	0.5%
Other Hardwoods	2.9%
Total	100.0%

Volume Estimates - Entire Province				*Volume in thousands of cubic metres*
Volume Type	Crown	Parks	Other	Total
Gross Total Volume	225,127.2	33,511.6	67,389.6	326,028.4
Net Merchantable Volume	82,815.3	12,671.3	28,198.2	123,684.7
Current Annual Increment	3,303.9	449.6	862.2	4,615.8
Mean Annual Increment	3,040.9	431.3	874.8	4,347.1

5.1.2 - Species Distribution - Cedar



Area and Volume Statistics - AOU Only

Average Species Statistics - Cedar

Statistic	2001	2006
Average Age (all stands)	94.2	91.1
Average Stocking (all stands)	70.2%	68.0%
Average Proportion of Cedar	23.4%	23.6%
Proportion of AOU Growing Stock	2.6%	2.2%

AOU Area Statistics - Cedar	*Area in thousands of hectares*	
Proportion	2001	2006
1-30% of Stand	2,984.0	3,075.4
31-60% of Stand	478.7	495.8
61-100% of Stand	237.8	253.4
Total Area Containing Cedar	3,700.5	3,824.7
Area of Cedar Working Group	721.8	781.9

AOU Volume Statistics - Cedar	*Volume in thousands of cubic metres*	
Volume Type	2001	2006
Gross Total Volume	131,051.6	131,788.9
Net Merchantable Volume	43,337.8	43,716.4
Current Annual Increment	1,121.7	1,027.4
Mean Annual Increment	1,349.3	1,305.4

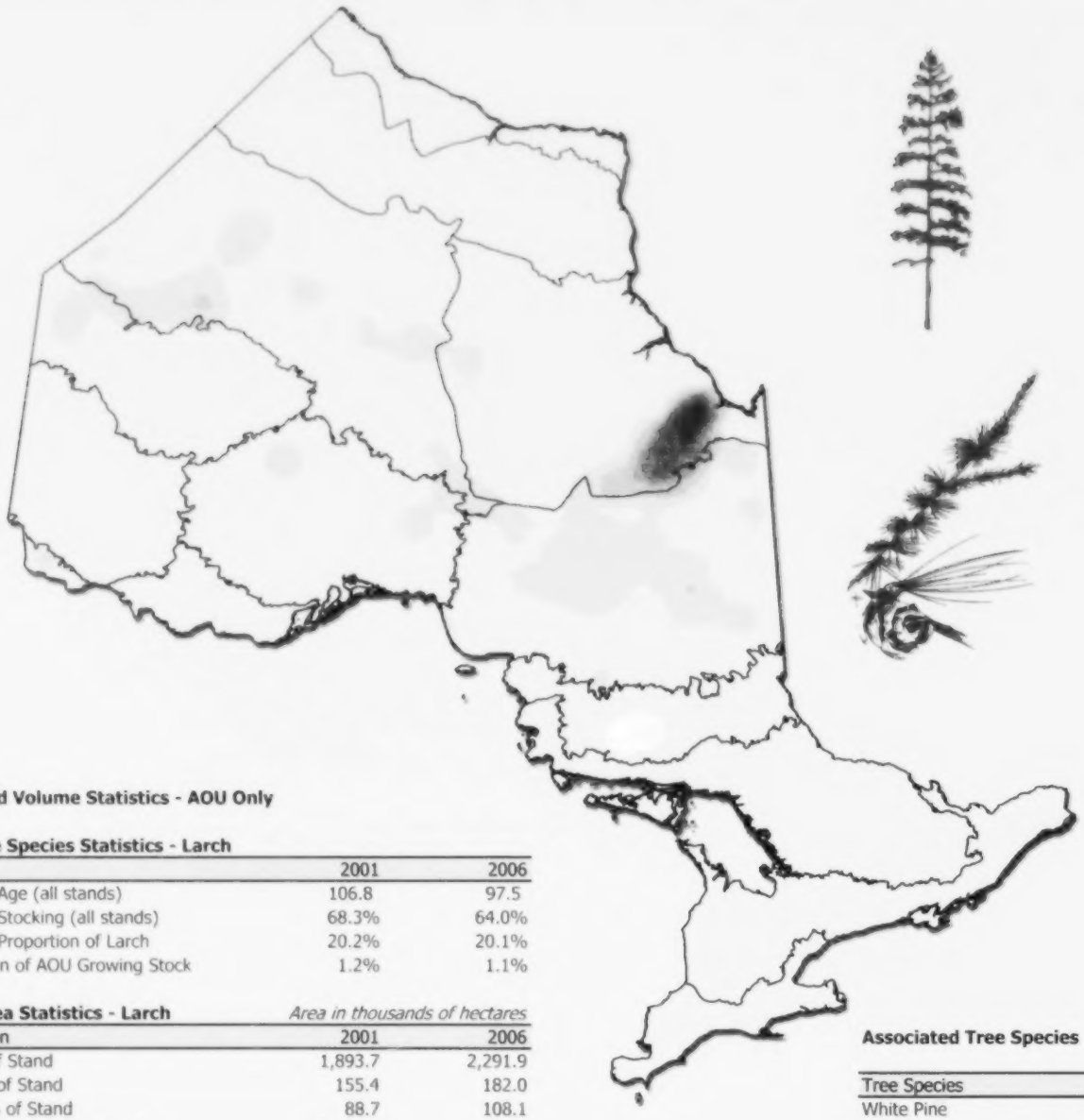
Relative Occurrence

Associated Tree Species

Tree Species	%
White Pine	2.7%
Red Pine	0.4%
Jack Pine	0.8%
Black Spruce	27.8%
White Spruce	3.9%
Balsam Fir	7.9%
Cedar	23.6%
Larch	3.7%
Hemlock	0.7%
Other Conifers	0.0%
Poplar	8.0%
White Birch	10.7%
Hard Maple	3.0%
Yellow Birch	2.3%
Ash	1.4%
Oak	0.4%
Other Hardwoods	2.8%
Total	100.0%

Volume Estimates - Entire Province			*Volume in thousands of cubic metres*	
Volume Type	Crown	Parks	Other	Total
Gross Total Volume	112,578.7	16,370.7	56,288.8	185,238.1
Net Merchantable Volume	35,434.5	5,273.5	20,194.9	60,902.9
Current Annual Increment	796.1	123.5	498.8	1,418.4
Mean Annual Increment	1,045.4	157.5	615.7	1,818.6

5.1.2 - Species Distribution - Larch



Area and Volume Statistics - AOU Only

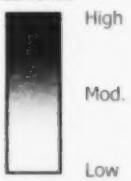
Average Species Statistics - Larch

Statistic	2001	2006
Average Age (all stands)	106.8	97.5
Average Stocking (all stands)	68.3%	64.0%
Average Proportion of Larch	20.2%	20.1%
Proportion of AOU Growing Stock	1.2%	1.1%

AOU Area Statistics - Larch	*Area in thousands of hectares*	
Proportion	2001	2006
1-30% of Stand	1,893.7	2,291.9
31-60% of Stand	155.4	182.0
61-100% of Stand	88.7	108.1
Total Area Containing Larch	2,137.8	2,582.1
Area of Larch Working Group	167.9	204.3

AOU Volume Statistics - Larch	*Volume in thousands of cubic metres*	
Volume Type	2001	2006
Gross Total Volume	57,832.7	61,978.2
Net Merchantable Volume	19,944.7	21,084.7
Current Annual Increment	450.1	477.0
Mean Annual Increment	566.3	600.8

Relative Occurrence

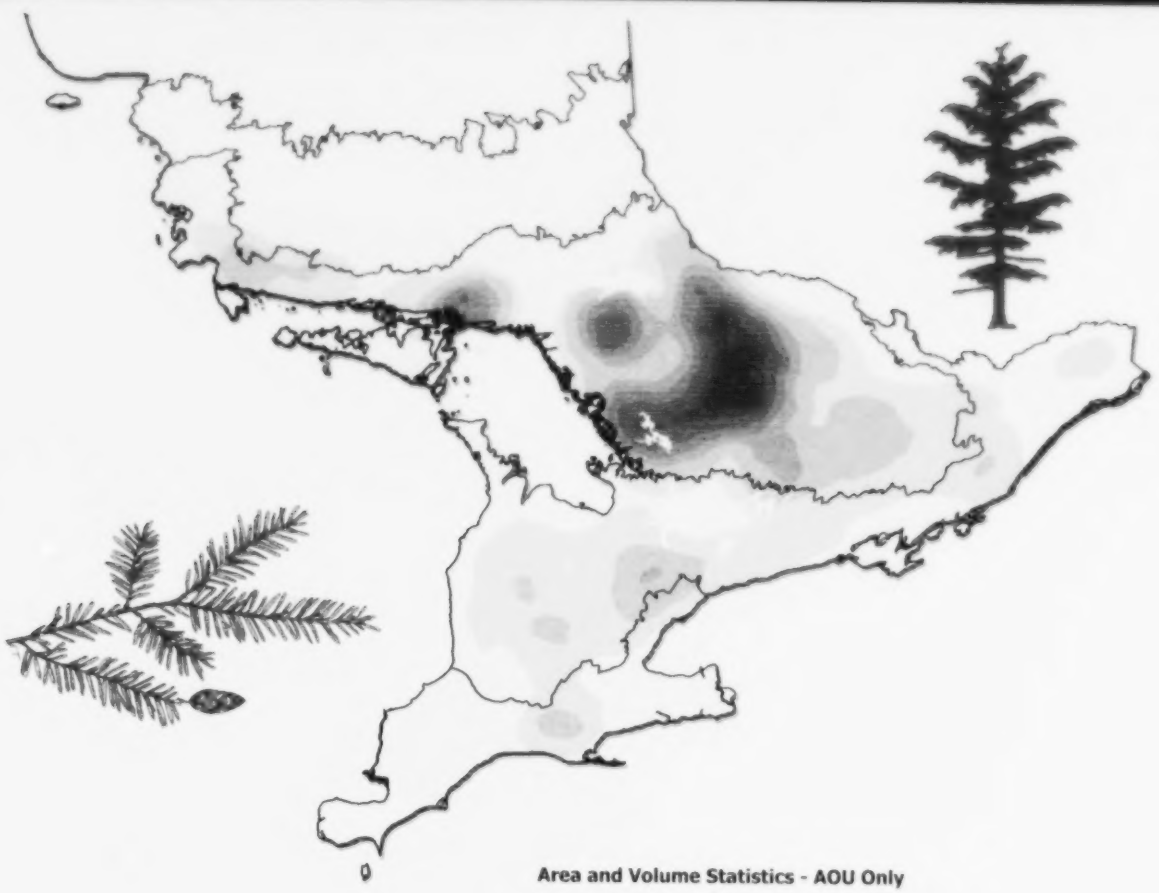


Associated Tree Species

Tree Species	%
White Pine	0.1%
Red Pine	0.0%
Jack Pine	1.2%
Black Spruce	63.4%
White Spruce	0.7%
Balsam Fir	2.9%
Cedar	7.5%
Larch	20.1%
Hemlock	0.0%
Other Conifers	0.0%
Poplar	2.0%
White Birch	1.0%
Hard Maple	0.1%
Yellow Birch	0.1%
Ash	0.6%
Oak	0.0%
Other Hardwoods	0.3%
Total	100.0%

Volume Estimates - Entire Province			*Volume in thousands of cubic metres*	
Volume Type	Crown	Parks	Other	Total
Gross Total Volume	87,954.5	9,471.4	11,363.0	108,788.9
Net Merchantable Volume	28,886.8	3,168.5	4,145.6	36,200.9
Current Annual Increment	649.9	65.9	109.6	825.4
Mean Annual Increment	829.4	87.5	127.1	1,044.0

5.1.2 - Species Distribution - Hemlock



Area and Volume Statistics - AOU Only

Average Species Statistics - Hemlock

Statistic	2001	2006
Average Age (all stands)	105.4	105.9
Average Stocking (all stands)	80.9%	81.0%
Average Proportion of Hemlock	19.1%	18.7%
Proportion of AOU Growing Stock	0.8%	0.7%

Associated Tree Species

Tree Species	%
White Pine	4.7%
Red Pine	0.3%
Jack Pine	0.1%
Black Spruce	0.4%
White Spruce	1.6%
Balsam Fir	3.9%
Cedar	2.1%
Larch	0.1%
Hemlock	18.7%
Other Conifers	0.0%
Poplar	3.5%
White Birch	3.6%
Hard Maple	32.2%
Yellow Birch	9.2%
Ash	0.9%
Oak	4.7%
Other Hardwoods	14.2%
Total	100.0%

Relative Occurrence

AOU Area Statistics - Hemlock *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	923.7	928.7
31-60% of Stand	116.0	112.6
61-100% of Stand	20.2	18.1
Total Area Containing Hemlock	1,059.9	1,059.4
Area of Hemlock Working Group	151.6	149.7

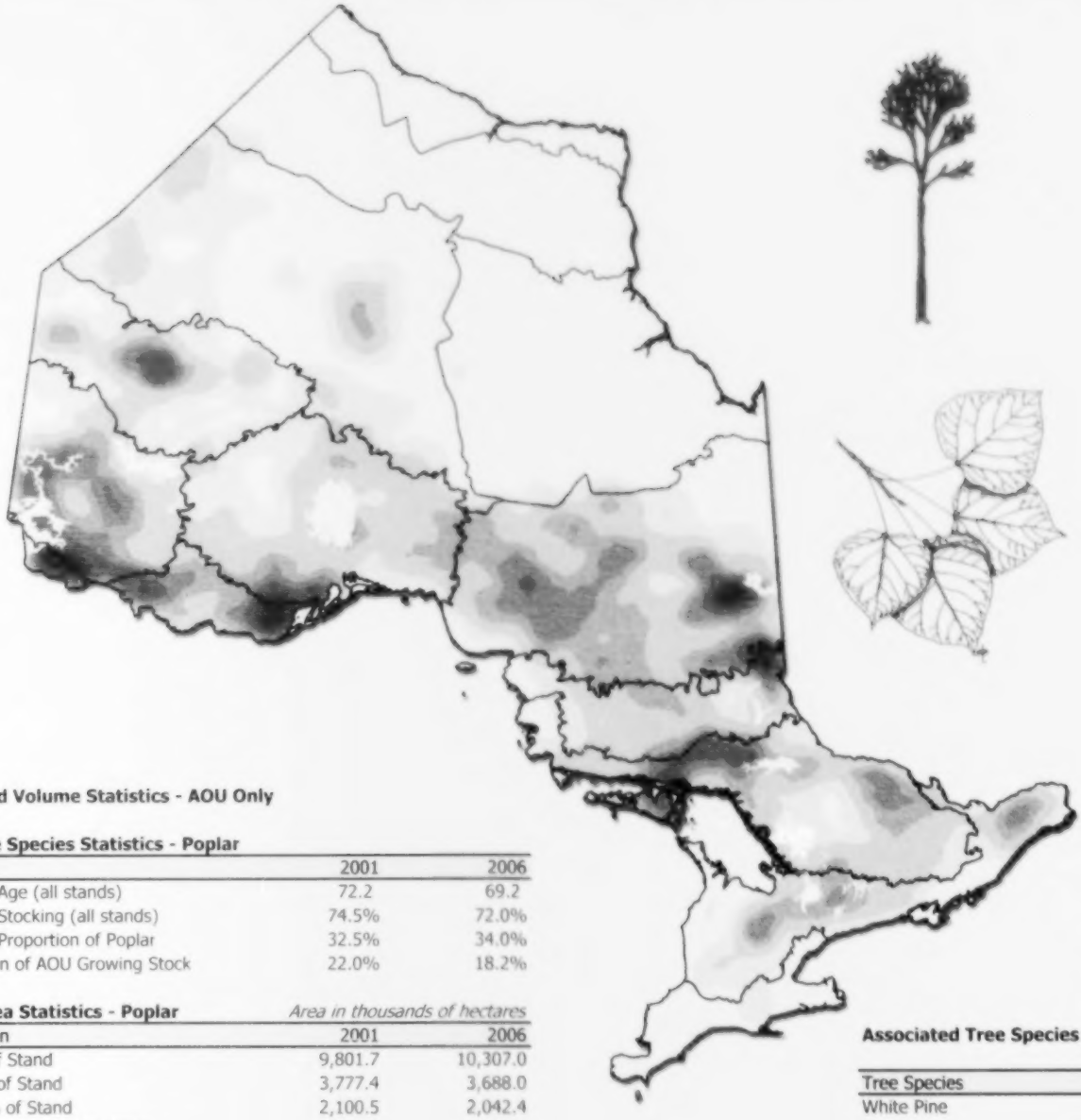
AOU Volume Statistics - Hemlock *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	41,415.3	41,748.1
Net Merchantable Volume	28,201.2	28,826.6
Current Annual Increment	295.9	271.5
Mean Annual Increment	387.2	369.8

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	21,392.6	6,902.2	23,871.2	52,165.9
Net Merchantable Volume	14,711.6	4,740.9	16,533.3	35,985.9
Current Annual Increment	117.9	38.6	204.6	361.0
Mean Annual Increment	170.4	53.8	258.6	482.7

5.1.2 - Species Distribution - Poplar



Area and Volume Statistics - AOU Only

Average Species Statistics - Poplar

Statistic	2001	2006
Average Age (all stands)	72.2	69.2
Average Stocking (all stands)	74.5%	72.0%
Average Proportion of Poplar	32.5%	34.0%
Proportion of AOU Growing Stock	22.0%	18.2%

AOU Area Statistics - Poplar	*Area in thousands of hectares*	
Proportion	2001	2006
1-30% of Stand	9,801.7	10,307.0
31-60% of Stand	3,777.4	3,688.0
61-100% of Stand	2,100.5	2,042.4
Total Area Containing Poplar	15,679.6	16,037.5
Area of Poplar Working Group	5,846.8	5,904.4

AOU Volume Statistics - Poplar	*Volume in thousands of cubic metres*	
Volume Type	2001	2006
Gross Total Volume	1,098,140.7	1,067,332.2
Net Merchantable Volume	692,857.7	667,580.0
Current Annual Increment	10,321.7	9,367.7
Mean Annual Increment	15,452.1	14,685.9

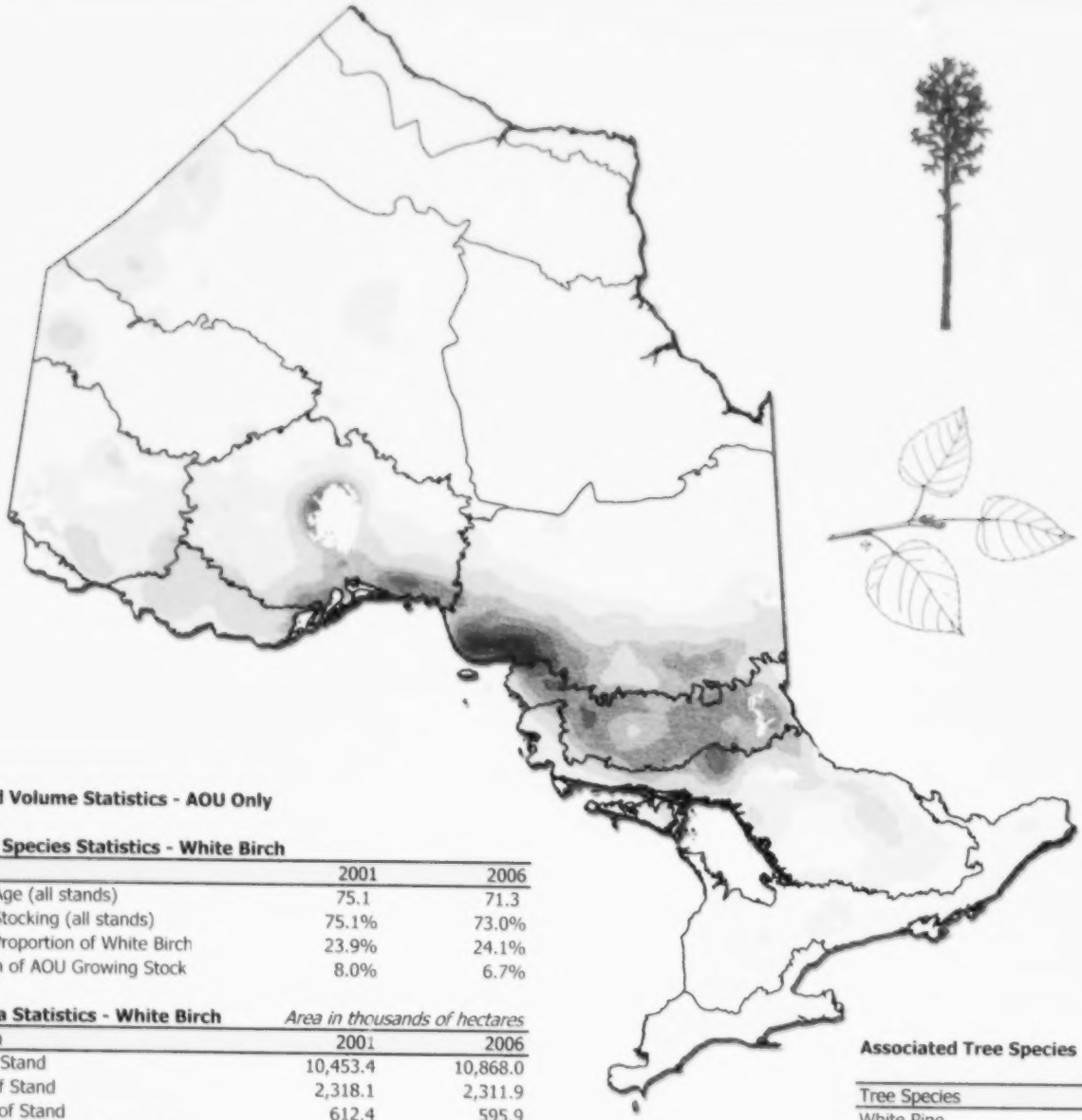
Relative Occurrence

Associated Tree Species

Tree Species	%
White Pine	3.0%
Red Pine	1.0%
Jack Pine	14.0%
Black Spruce	19.0%
White Spruce	3.0%
Balsam Fir	7.0%
Cedar	1.0%
Larch	0.0%
Hemlock	0.0%
Other Conifers	0.0%
Poplar	34.0%
White Birch	13.0%
Hard Maple	2.0%
Yellow Birch	0.0%
Ash	0.0%
Oak	1.0%
Other Hardwoods	2.0%
Total	100.0%

Volume Estimates - Entire Province			*Volume in thousands of cubic metres*	
Volume Type	Crown	Parks	Other	Total
Gross Total Volume	1,111,886.5	145,068.4	250,130.2	1,507,085.2
Net Merchantable Volume	683,576.9	90,474.6	163,195.1	937,246.6
Current Annual Increment	9,597.3	1,085.4	2,115.2	12,797.9
Mean Annual Increment	15,080.7	1,871.7	3,411.1	20,363.5

5.1.2 - Species Distribution - White Birch



Area and Volume Statistics - AOU Only

Average Species Statistics - White Birch

Statistic	2001	2006
Average Age (all stands)	75.1	71.3
Average Stocking (all stands)	75.1%	73.0%
Average Proportion of White Birch	23.9%	24.1%
Proportion of AOU Growing Stock	8.0%	6.7%

AOU Area Statistics - White Birch *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	10,453.4	10,868.0
31-60% of Stand	2,318.1	2,311.9
61-100% of Stand	612.4	595.9
Total Area Containing White Birch	13,383.9	13,775.8
Area of White Birch Working Group	2,984.6	3,097.5

AOU Volume Statistics - White Birch *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	399,422.5	393,712.8
Net Merchantable Volume	235,567.2	234,481.5
Current Annual Increment	3,189.1	2,568.9
Mean Annual Increment	5,694.5	5,302.5

Relative Occurrence

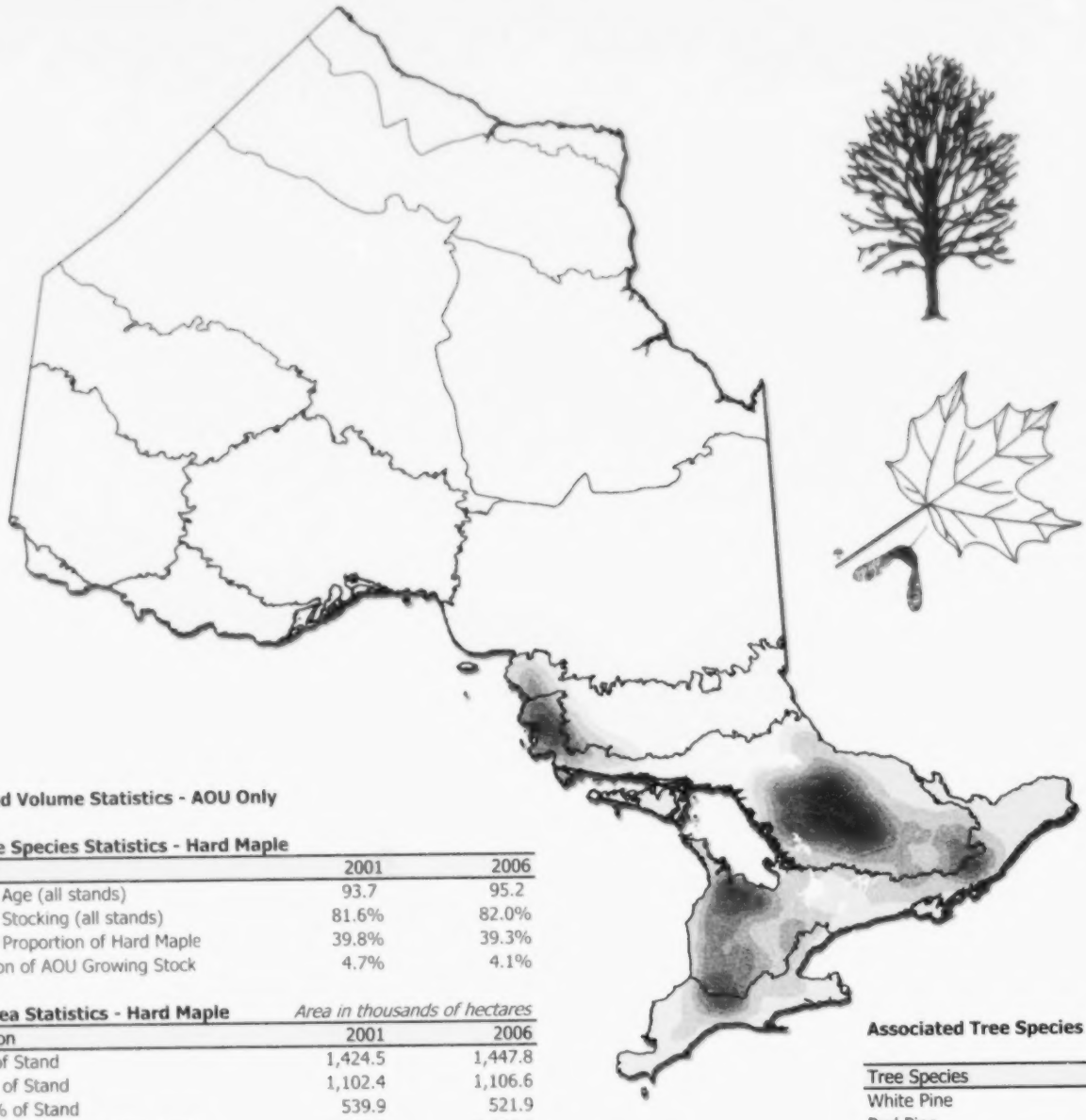
Associated Tree Species

Tree Species	%
White Pine	3.2%
Red Pine	0.7%
Jack Pine	9.3%
Black Spruce	19.1%
White Spruce	4.2%
Balsam Fir	8.3%
Cedar	2.4%
Larch	0.2%
Hemlock	0.3%
Other Conifers	0.0%
Poplar	21.4%
White Birch	24.1%
Hard Maple	2.4%
Yellow Birch	0.8%
Ash	0.2%
Oak	0.8%
Other Hardwoods	2.7%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	354,490.0	62,046.8	66,078.5	482,615.3
Net Merchantable Volume	209,643.6	37,094.1	40,311.1	287,048.9
Current Annual Increment	2,427.7	369.9	367.5	3,165.1
Mean Annual Increment	4,788.4	814.6	872.1	6,475.1

5.1.2 - Species Distribution - Hard Maple (Sugar Maple)



Area and Volume Statistics - AOU Only

Average Species Statistics - Hard Maple

Statistic	2001	2006
Average Age (all stands)	93.7	95.2
Average Stocking (all stands)	81.6%	82.0%
Average Proportion of Hard Maple	39.8%	39.3%
Proportion of AOU Growing Stock	4.7%	4.1%

AOU Area Statistics - Hard Maple *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	1,424.5	1,447.8
31-60% of Stand	1,102.4	1,106.6
61-100% of Stand	539.9	521.9
Total Area Containing Hard Maple	3,066.8	3,076.4
Area of Hard Maple Working Group	1,846.8	1,865.2

AOU Volume Statistics - Hard Maple *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	234,588.7	242,982.3
Net Merchantable Volume	146,459.1	154,570.4
Current Annual Increment	2,154.0	2,062.8
Mean Annual Increment	2,474.2	2,472.3

Relative Occurrence

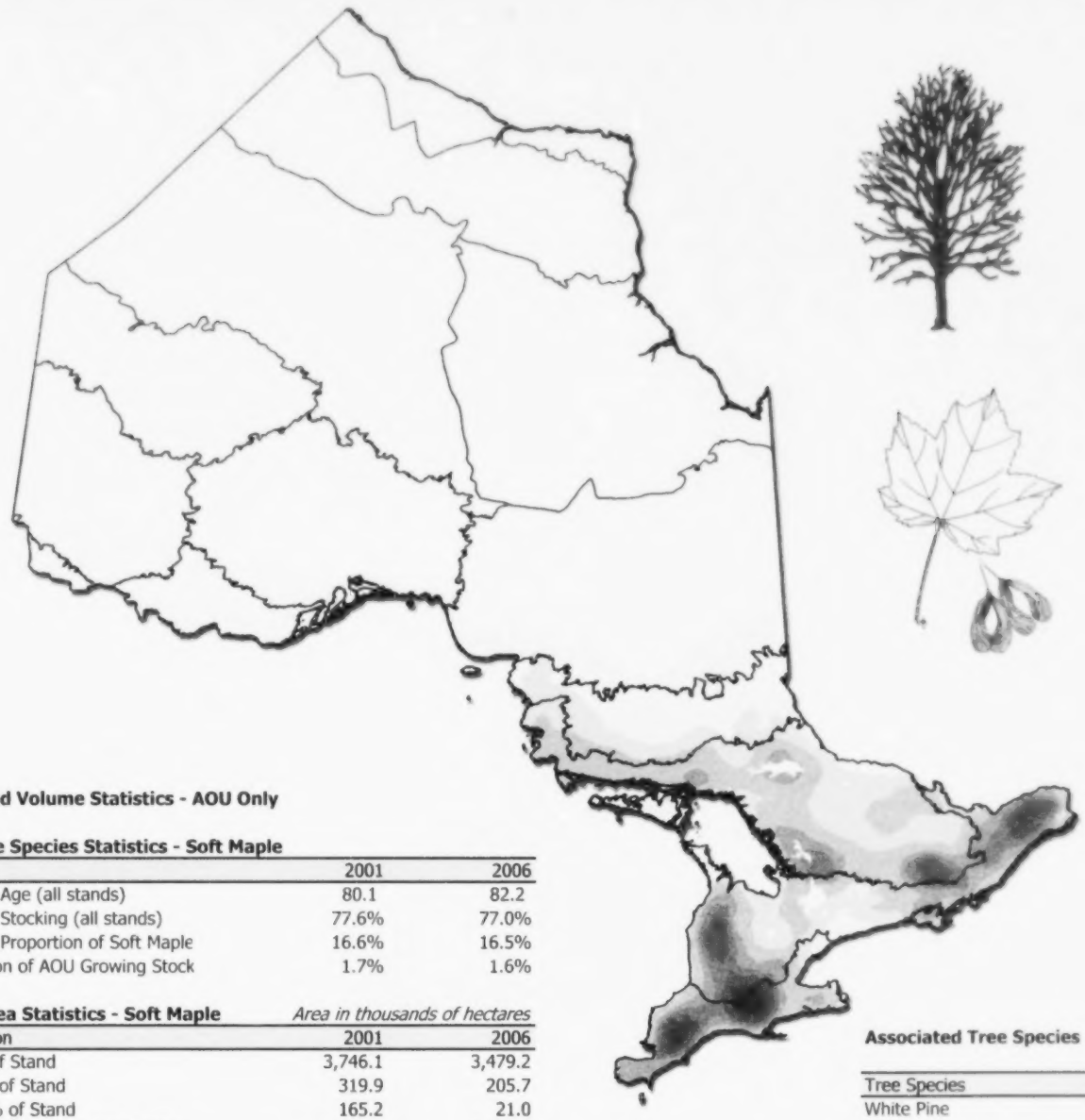
Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	125,977.2	22,972.5	171,153.7	320,103.3
Net Merchantable Volume	80,004.6	14,519.6	109,037.7	203,561.9
Current Annual Increment	942.9	158.6	1,745.7	2,847.2
Mean Annual Increment	1,213.0	214.1	1,895.9	3,323.1

Associated Tree Species

Tree Species	%
White Pine	3.9%
Red Pine	0.3%
Jack Pine	0.1%
Black Spruce	0.5%
White Spruce	2.8%
Balsam Fir	4.6%
Cedar	2.3%
Larch	0.0%
Hemlock	4.8%
Other Conifers	0.0%
Poplar	6.4%
White Birch	7.9%
Hard Maple	39.3%
Yellow Birch	7.9%
Ash	1.0%
Oak	4.8%
Other Hardwoods	13.3%
Total	100.0%

5.1.2 - Species Distribution - Soft Maple (Red Maple)



Area and Volume Statistics - AOU Only

Average Species Statistics - Soft Maple

Statistic	2001	2006
Average Age (all stands)	80.1	82.2
Average Stocking (all stands)	77.6%	77.0%
Average Proportion of Soft Maple	16.6%	16.5%
Proportion of AOU Growing Stock	1.7%	1.6%

AOU Area Statistics - Soft Maple *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	3,746.1	3,479.2
31-60% of Stand	319.9	205.7
61-100% of Stand	165.2	21.0
Total Area Containing Soft Maple	4,231.2	3,706.0
Area of Soft Maple Working Group	344.7	355.6

AOU Volume Statistics - Soft Maple *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	85,100.9	91,484.7
Net Merchantable Volume	44,118.5	63,892.6
Current Annual Increment	1,139.7	1,114.4
Mean Annual Increment	1,091.9	1,115.6

Relative Occurrence

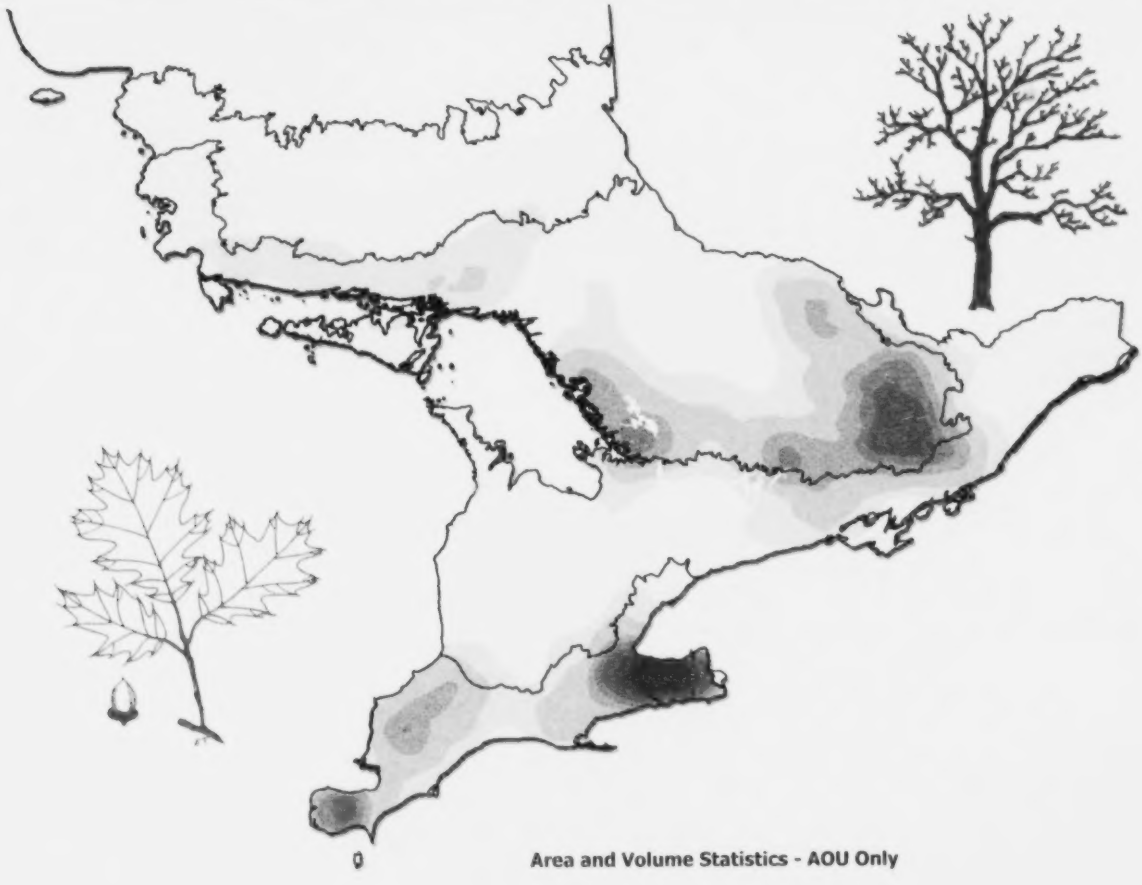
Associated Tree Species

Tree Species	%
White Pine	8.1%
Red Pine	0.9%
Jack Pine	1.7%
Black Spruce	2.5%
White Spruce	4.2%
Balsam Fir	7.1%
Cedar	2.9%
Larch	0.1%
Hemlock	2.9%
Other Conifers	0.0%
Poplar	14.0%
White Birch	13.9%
Hard Maple	13.5%
Yellow Birch	3.8%
Ash	1.3%
Oak	4.8%
Other Hardwoods	18.2%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	44,055.7	10,353.0	67,956.7	122,365.4
Net Merchantable Volume	30,650.0	7,281.2	47,474.1	85,405.3
Current Annual Increment	532.9	121.9	852.3	1,507.2
Mean Annual Increment	535.8	123.7	841.8	1,501.3

5.1.2 - Species Distribution - Oak (All)



Relative Occurrence

High

Mod.

Low

Associated Tree Species

Tree Species	%
White Pine	12.0%
Red Pine	1.0%
Jack Pine	1.0%
Black Spruce	0.0%
White Spruce	2.0%
Balsam Fir	3.0%
Cedar	1.0%
Larch	0.0%
Hemlock	3.0%
Other Conifers	0.0%
Poplar	11.0%
White Birch	8.0%
Hard Maple	17.0%
Yellow Birch	1.0%
Ash	1.0%
Oak	24.0%
Other Hardwoods	15.0%
Total	100.0%

Area and Volume Statistics - AOU Only

Average Species Statistics - Oak (All)

Statistic	2001	2006
Average Age (all stands)	82.6	85.4
Average Stocking (all stands)	76.8%	76.0%
Average Proportion of Oak (All)	23.1%	23.0%
Proportion of AOU Growing Stock	0.9%	0.8%

AOU Area Statistics - Oak (All) *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	973.3	1,008.8
31-60% of Stand	201.8	195.7
61-100% of Stand	52.7	37.3
Total Area Containing Oak (All)	1,227.8	1,241.8
Area of Oak (All) Working Group	306.8	282.5

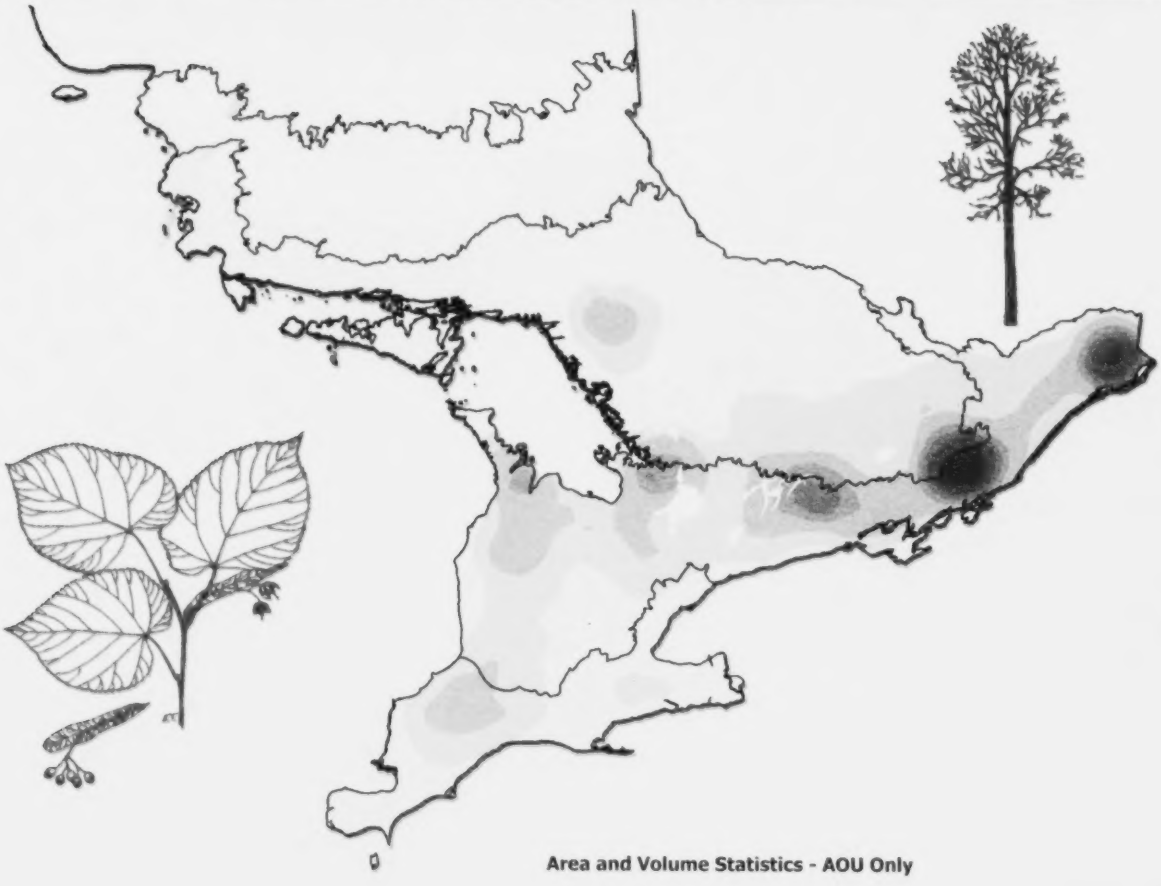
AOU Volume Statistics - Oak (All) *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	44,075.6	44,280.3
Net Merchantable Volume	31,732.3	32,633.8
Current Annual Increment	510.9	464.7
Mean Annual Increment	523.4	500.5

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	19,725.8	5,262.7	46,970.0	71,958.4
Net Merchantable Volume	14,611.6	3,854.6	34,632.1	53,098.3
Current Annual Increment	203.0	56.3	494.3	753.5
Mean Annual Increment	221.0	59.9	531.4	812.3

5.1.2 - Species Distribution - Basswood



Area and Volume Statistics - AOU Only

Average Species Statistics - Basswood

Statistic	2001	2006
Average Age (all stands)	85.8	88.3
Average Stocking (all stands)	86.0%	83.0%
Average Proportion of Basswood	13.0%	12.6%
Proportion of AOU Growing Stock	n/a	0.2%

AOU Area Statistics - Basswood *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	346.4	348.6
31-60% of Stand	3.0	2.1
61-100% of Stand	0.3	0.2
Total Area Containing Basswood	349.6	350.9
Area of Basswood Working Group	n/a	n/a

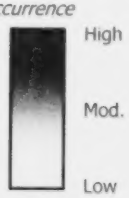
AOU Volume Statistics - Basswood *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	n/a	8,863.6
Net Merchantable Volume	n/a	6,507.4
Current Annual Increment	n/a	95.1
Mean Annual Increment	n/a	100.8

Associated Tree Species

Tree Species	%
White Pine	2.3%
Red Pine	0.1%
Jack Pine	0.0%
Black Spruce	0.0%
White Spruce	1.3%
Balsam Fir	2.5%
Cedar	2.4%
Larch	0.0%
Hemlock	3.0%
Other Conifers	0.0%
Poplar	6.0%
White Birch	2.9%
Hard Maple	41.6%
Yellow Birch	2.5%
Ash	3.4%
Oak	6.8%
Other Hardwoods	25.3%
Total	100.0%

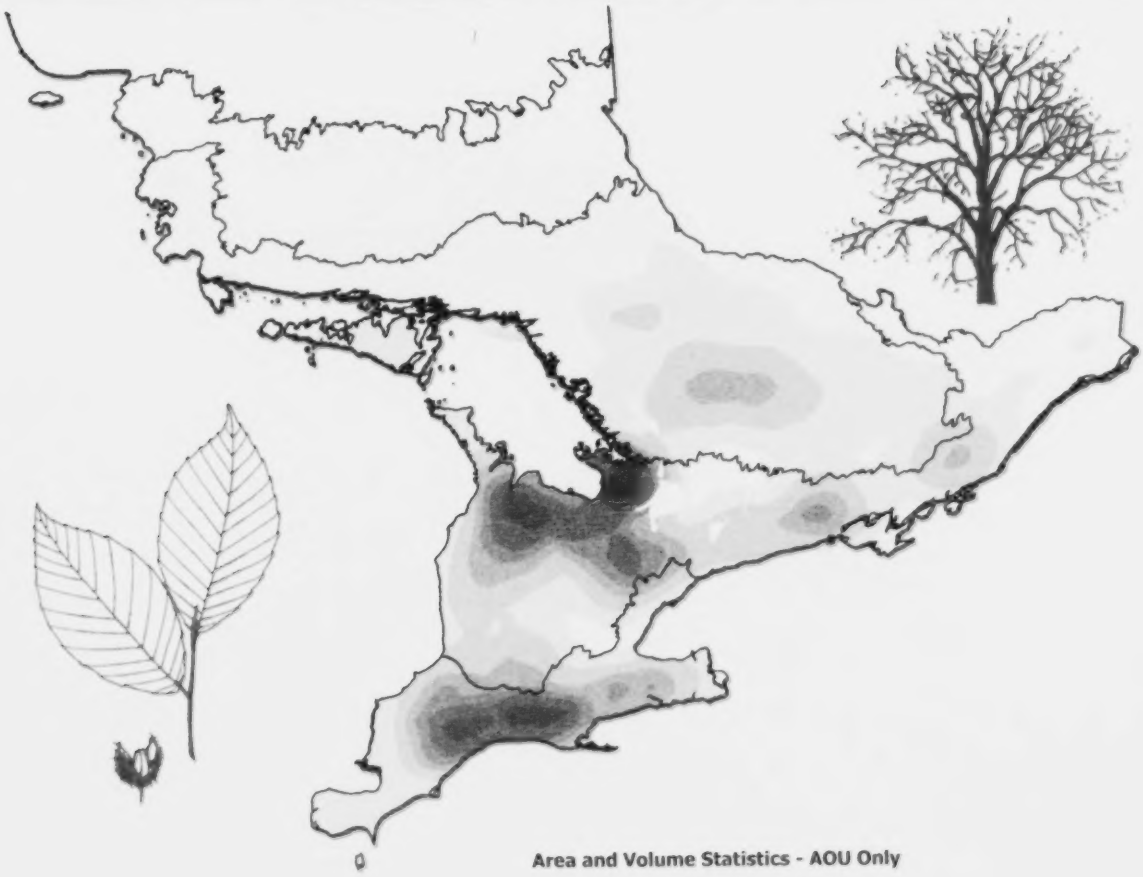
Relative Occurrence



Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	2,662.2	369.1	12,932.8	15,964.1
Net Merchantable Volume	1,972.0	271.8	9,449.9	11,693.7
Current Annual Increment	26.5	3.8	144.4	174.7
Mean Annual Increment	29.2	4.1	150.3	183.6

5.1.2 - Species Distribution - Beech



Area and Volume Statistics - AOU Only

Average Species Statistics - Beech

Statistic	2001	2006
Average Age (all stands)	104.4	103.8
Average Stocking (all stands)	82.7%	83.0%
Average Proportion of Beech	14.6%	14.2%
Proportion of AOU Growing Stock	n/a	0.3%

AOU Area Statistics - Beech *Area in thousands of hectares*

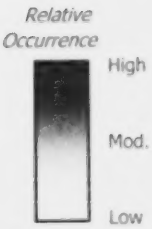
Proportion	2001	2006
1-30% of Stand	546.6	572.3
31-60% of Stand	9.9	9.3
61-100% of Stand	2.3	0.4
Total Area Containing Beech	558.8	582.0
Area of Beech Working Group	n/a	n/a

AOU Volume Statistics - Beech *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	n/a	18,326.8
Net Merchantable Volume	n/a	13,768.1
Current Annual Increment	n/a	141.4
Mean Annual Increment	n/a	177.9

Associated Tree Species

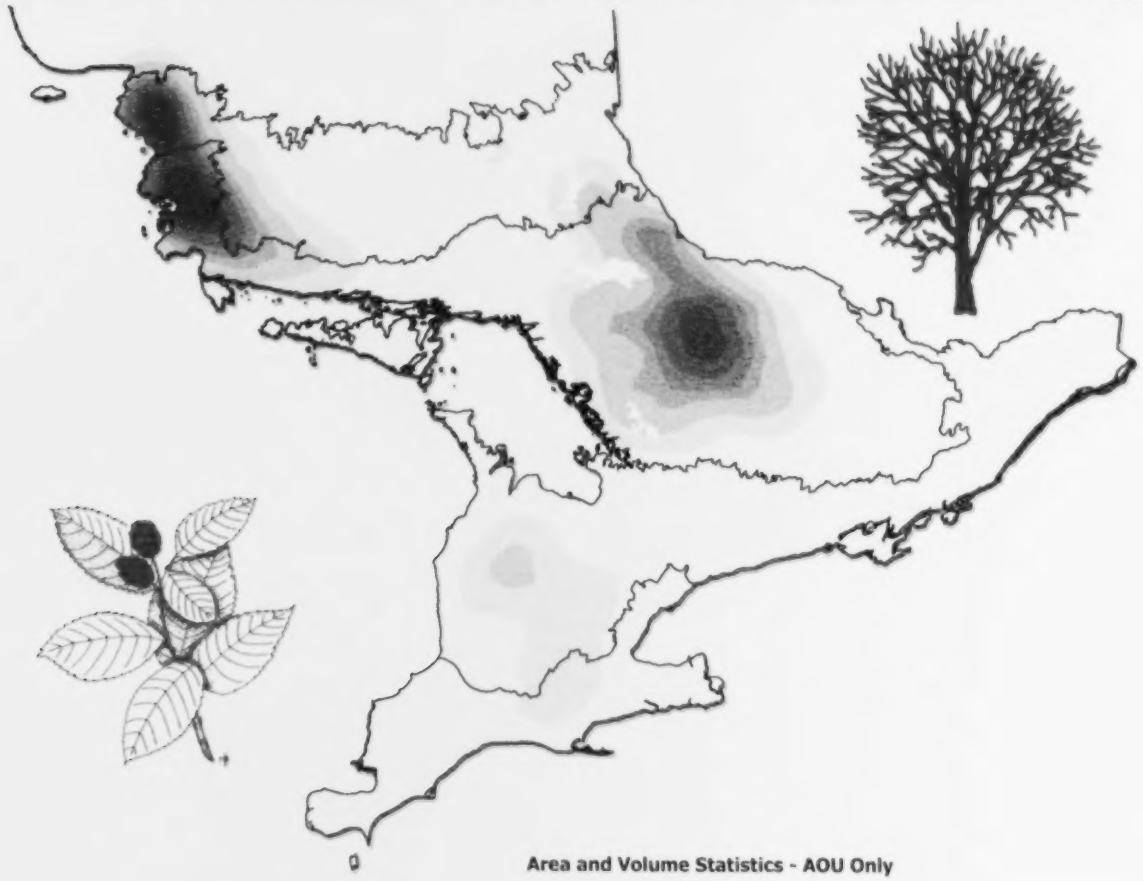
Tree Species	%
White Pine	1.4%
Red Pine	0.1%
Jack Pine	0.0%
Black Spruce	0.1%
White Spruce	0.7%
Balsam Fir	1.6%
Cedar	0.5%
Larch	0.0%
Hemlock	6.6%
Other Conifers	0.0%
Poplar	2.7%
White Birch	2.0%
Hard Maple	50.3%
Yellow Birch	5.4%
Ash	1.1%
Oak	4.5%
Other Hardwoods	23.0%
Total	100.0%



Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	7,990.9	1,243.9	18,518.9	27,753.7
Net Merchantable Volume	6,007.2	926.9	13,889.6	20,823.8
Current Annual Increment	49.1	7.2	172.9	229.2
Mean Annual Increment	70.7	10.8	195.9	277.4

5.1.2 - Species Distribution - Yellow Birch



Area and Volume Statistics - AOU Only

Average Species Statistics - Yellow Birch

Statistic	2001	2006
Average Age (all stands)	103.5	104.6
Average Stocking (all stands)	80.5%	81.0%
Average Proportion of Yellow Birch	17.0%	17.1%
Proportion of AOU Growing Stock	1.2%	1.0%

AOU Area Statistics - Yellow Birch *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	1,679.8	1,672.5
31-60% of Stand	113.2	112.9
61-100% of Stand	4.9	5.7
Total Area Containing Yellow Birch	1,797.9	1,791.1
Area of Yellow Birch Working Group	154.4	153.1

AOU Volume Statistics - Yellow Birch *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	58,856.3	60,371.8
Net Merchantable Volume	43,386.7	45,040.1
Current Annual Increment	450.8	428.7
Mean Annual Increment	570.0	566.1

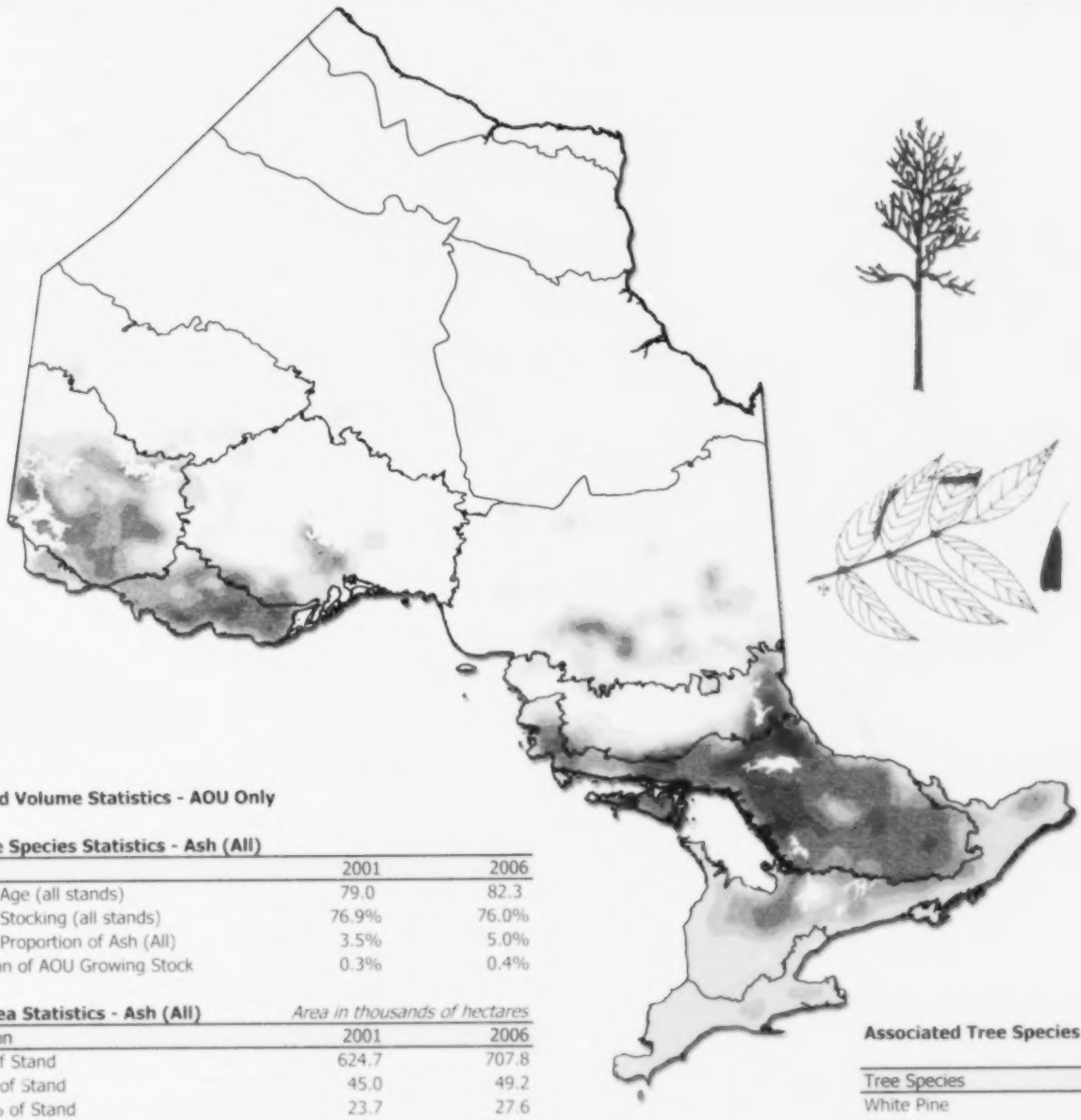
Associated Tree Species

Tree Species	%
White Pine	2.8%
Red Pine	0.1%
Jack Pine	0.1%
Black Spruce	1.4%
White Spruce	3.9%
Balsam Fir	6.2%
Cedar	4.5%
Larch	0.1%
Hemlock	6.6%
Other Conifers	0.0%
Poplar	2.8%
White Birch	7.4%
Hard Maple	35.1%
Yellow Birch	17.1%
Ash	0.5%
Oak	1.1%
Other Hardwoods	10.3%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	38,156.0	7,110.0	22,384.6	67,650.6
Net Merchantable Volume	28,443.8	5,254.8	16,810.0	50,508.7
Current Annual Increment	257.3	42.6	185.3	485.1
Mean Annual Increment	350.5	61.7	224.4	636.7

5.1.2 - Species Distribution - Ash (All)



Area and Volume Statistics - AOU Only

Average Species Statistics - Ash (All)

Statistic	2001	2006
Average Age (all stands)	79.0	82.3
Average Stocking (all stands)	76.9%	76.0%
Average Proportion of Ash (All)	3.5%	5.0%
Proportion of AOU Growing Stock	0.3%	0.4%

AOU Area Statistics - Ash (All) *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	624.7	707.8
31-60% of Stand	45.0	49.2
61-100% of Stand	23.7	27.6
Total Area Containing Ash (All)	693.5	784.6
Area of Ash (All) Working Group	67.4	79.9

AOU Volume Statistics - Ash (All) *Volume in thousands of cubic metres*

Volume Type	2001	2006
Gross Total Volume	15,008.3	20,346.2
Net Merchantable Volume	7,738.4	14,172.1
Current Annual Increment	206.3	254.2
Mean Annual Increment	195.0	251.1

Relative Occurrence

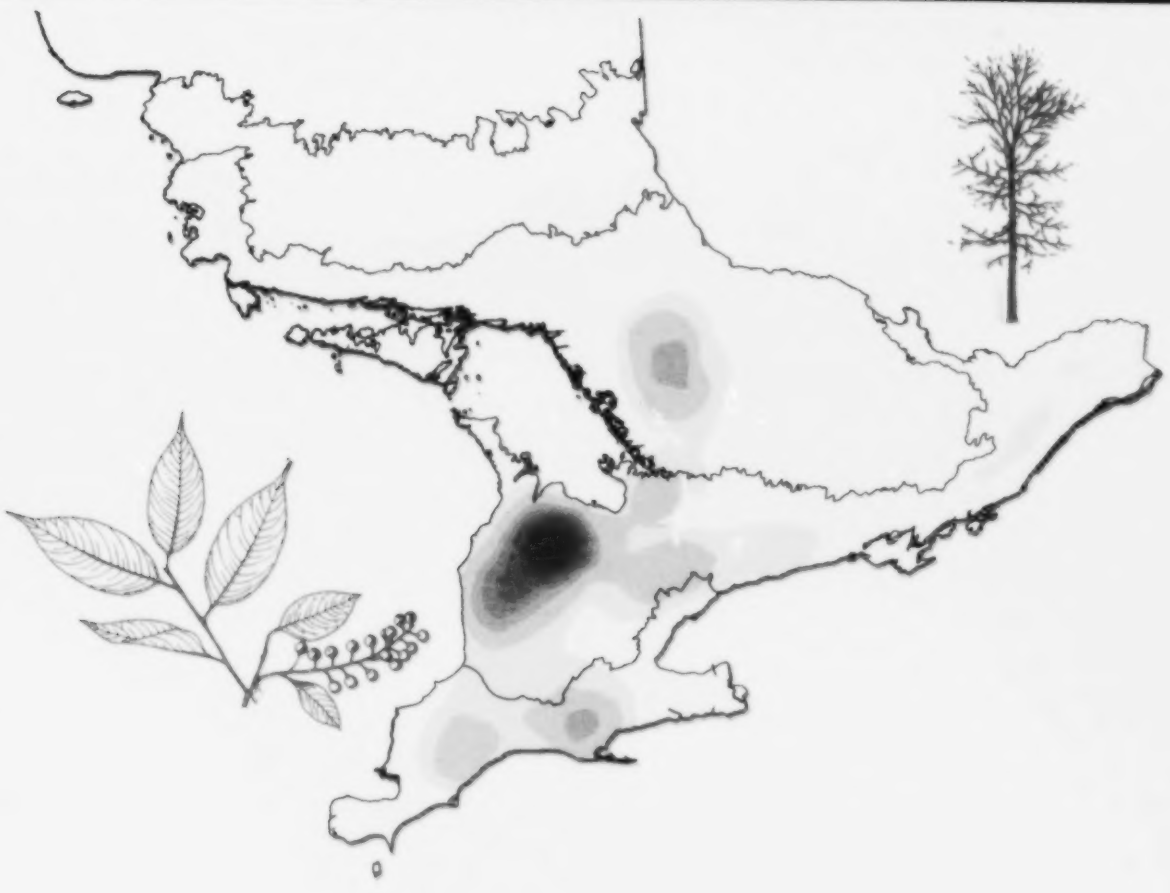
Associated Tree Species

Tree Species	%
White Pine	3.0%
Red Pine	0.0%
Jack Pine	1.0%
Black Spruce	4.0%
White Spruce	3.0%
Balsam Fir	8.0%
Cedar	10.0%
Larch	2.0%
Hemlock	1.0%
Other Conifers	0.0%
Poplar	18.0%
White Birch	4.0%
Hard Maple	12.0%
Yellow Birch	1.0%
Ash	18.0%
Oak	3.0%
Other Hardwoods	12.0%
Total	100.0%

Volume Estimates - Entire Province *Volume in thousands of cubic metres*

Volume Type	Crown	Parks	Other	Total
Gross Total Volume	6,809.4	1,949.7	22,695.1	31,454.2
Net Merchantable Volume	4,848.5	1,377.4	15,627.8	21,853.8
Current Annual Increment	78.4	23.1	297.5	399.0
Mean Annual Increment	80.2	23.4	287.6	391.2

5.1.2 - Species Distribution - Cherry



Associated Tree Species

Tree Species	%
White Pine	0.9%
Red Pine	0.1%
Jack Pine	0.0%
Black Spruce	0.1%
White Spruce	1.2%
Balsam Fir	3.4%
Cedar	0.4%
Larch	0.1%
Hemlock	3.6%
Other Conifers	0.0%
Poplar	3.9%
White Birch	1.7%
Hard Maple	47.9%
Yellow Birch	7.4%
Ash	1.0%
Oak	1.8%
Other Hardwoods	26.8%
Total	100.0%

Relative Occurrence

Area and Volume Statistics - AOU Only

Average Species Statistics - Cherry

Statistic	2001	2006
Average Age (all stands)	87.2	90.4
Average Stocking (all stands)	88.7%	88.0%
Average Proportion of Cherry	12.4%	12.4%

Area Statistics - Cherry *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	94.2	139.3
31-60% of Stand	0.8	0.9
61-100% of Stand	0.0	0.0
Total Area Containing Cherry	95.0	140.2

5.1.2 - Species Distribution - Ironwood

Associated Tree Species

Tree Species	%
White Pine	4.5%
Red Pine	0.2%
Jack Pine	0.0%
Black Spruce	0.0%
White Spruce	1.3%
Balsam Fir	2.5%
Cedar	3.3%
Larch	0.0%
Hemlock	2.5%
Other Conifers	0.0%
Poplar	5.4%
White Birch	2.9%
Hard Maple	33.5%
Yellow Birch	1.3%
Ash	3.4%
Oak	11.5%
Other Hardwoods	27.8%
Total	100.0%

Relative Occurrence

Area and Volume Statistics - AOU Only

Average Species Statistics - Ironwood

Statistic	2001	2006
Average Age (all stands)	80.6	80.6
Average Stocking (all stands)	87.6%	85.0%
Average Proportion of Ironwood	13.4%	13.1%

Area Statistics - Ironwood *Area in thousands of hectares*

Proportion	2001	2006
1-30% of Stand	114.7	159.2
31-60% of Stand	3.9	4.6
61-100% of Stand	0.4	0.4
Total Area Containing Ironwood	119.0	164.2

6 – Historical Summaries

During the past 75 years, the OMNR has produced many iterations of the publication *The Forest Resources of Ontario*. With each publication, the underlying information differs in terms of inventory age, sources and methodology. These differences should be noted when addressing the historical comparisons in Chapter 6.

The summaries highlighted in this chapter are based on the AOU, and are being compared to adjusted numbers from 2001, 1996, and 1986, which utilize information from both southern and northern Ontario areas outside of the AOU. These non-AOU area totals have been deducted from the 1996 and 2001 statistics, and estimated for the 1986 version.

Although five years has passed since the 2001 version of this report, the actual inventories being summarized are not simply five years older. Updates of older inventories, changes due to harvest, forest fire or natural disturbances have been incorporated as well as new inventories. The vintages of these inventories are highlighted in Chapter 3.2.

Changes in methodology have also affected some working group statistics. Over that past 10 years, increases in resolution and more attention to detail may give the impression that some species have changed dramatically, where in reality changes have not occurred on the ground. Although there have been changes in the forest, there have also been changes in how we measure the forest.

Readers should also note that in the 1986 version of this report, the age class summary grouped everything 121 years or older as one age class, where the subsequent three versions went to 181 years or older. Previous to the 1986 report, most summaries in this series did not describe forest in age classes, but in terms of maturity and diameter classes.

Measuring jack pine growth - plot sampling circa 1955

6.1 - Historical Working Group Summaries - AOU

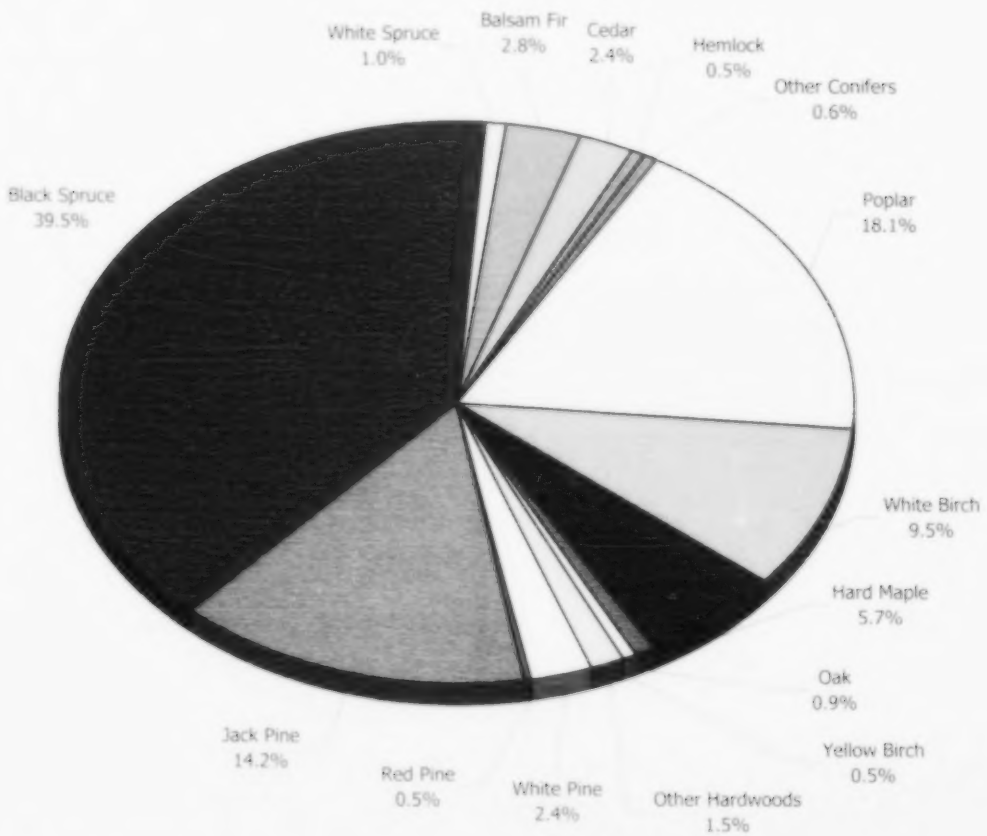
Total Area by Working Group

Area in thousands of hectares

Working Group Species	1986	1996	2001	2006	Proportion 2006
White Pine	571.0	744.1	775.2	786.5	2.4%
Red Pine	158.4	131.2	148.5	163.7	0.5%
Jack Pine	4,319.1	4,426.0	4,576.8	4,652.7	14.2%
**Spruce (All)*	*13,670.9*	*13,237.3*	*13,193.1*	*13,229.5*	*40.5%*
Black Spruce	n/a	12,915.1	12,890.7	12,904.5	39.5%
White Spruce	n/a	322.1	302.4	325.0	1.0%
Balsam Fir	1,862.4	1,705.8	1,365.1	921.8	2.8%
White Cedar	n/a	485.1	721.8	781.9	2.4%
Hemlock	108.4	143.9	151.6	149.7	0.5%
**Other Conifers (All)*	*885.0*	*858.9*	*917.2*	*991.6*	*3.0%*
Other Conifers	n/a	373.7	195.5	209.7	0.6%
Poplar	5,012.0	5,712.8	5,846.8	5,904.4	18.1%
White Birch	2,829.0	3,001.0	2,984.6	3,097.5	9.5%
Hard Maple	2,391.9	1,955.0	1,846.8	1,865.2	5.7%
Oak	n/a	162.3	306.8	282.5	0.9%
Yellow Birch	162.9	139.0	154.4	153.1	0.5%
**Other Hardwoods (All)*	*710.1*	*626.3*	*746.1*	*765.5*	*2.3%*
Other Hardwoods	n/a	464.0	439.3	483.0	1.5%
Total	32,681.3	32,681.3	32,706.4	32,681.3	100.0%

** Forest Resources of Ontario 1986 grouped spruce (black and white), other conifers (including white cedar), and other hardwoods (including oak), so these lines are double counted for comparitive purposes. Use caution with italicized lines.*

Species Proportion by Working Group within the AOU



6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

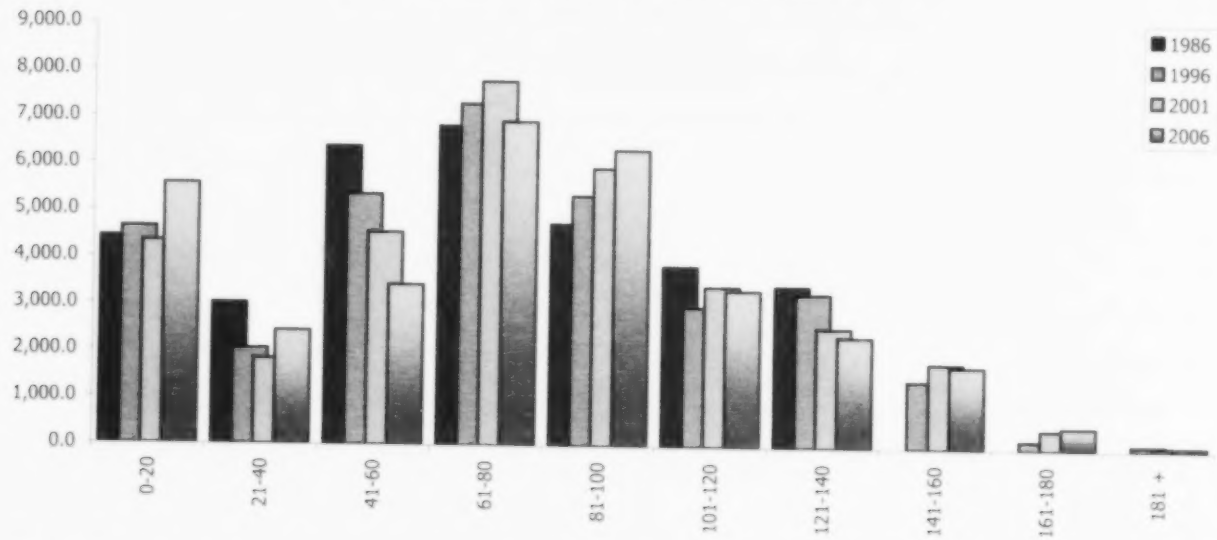
All Working Groups

Age Class	1986	1996	2001	2006
0-20	4,431.2	4,649.5	4,345.0	5,576.6
21-40	3,025.4	2,047.7	1,831.0	2,430.0
41-60	6,381.7	5,353.2	4,545.8	3,425.0
61-80	6,825.0	7,301.3	7,781.6	6,926.0
81-100	4,736.1	5,343.6	5,932.4	6,325.6
101-120	3,847.1	2,980.9	3,422.3	3,341.9
121-140	3,434.8	3,279.2	2,549.1	2,360.2
141-160	n/a	1,435.9	1,809.0	1,746.6
161-180	n/a	184.5	409.2	472.3
181 +	n/a	105.4	80.9	77.1
Total:	32,681.3	32,681.3	32,706.4	32,681.3

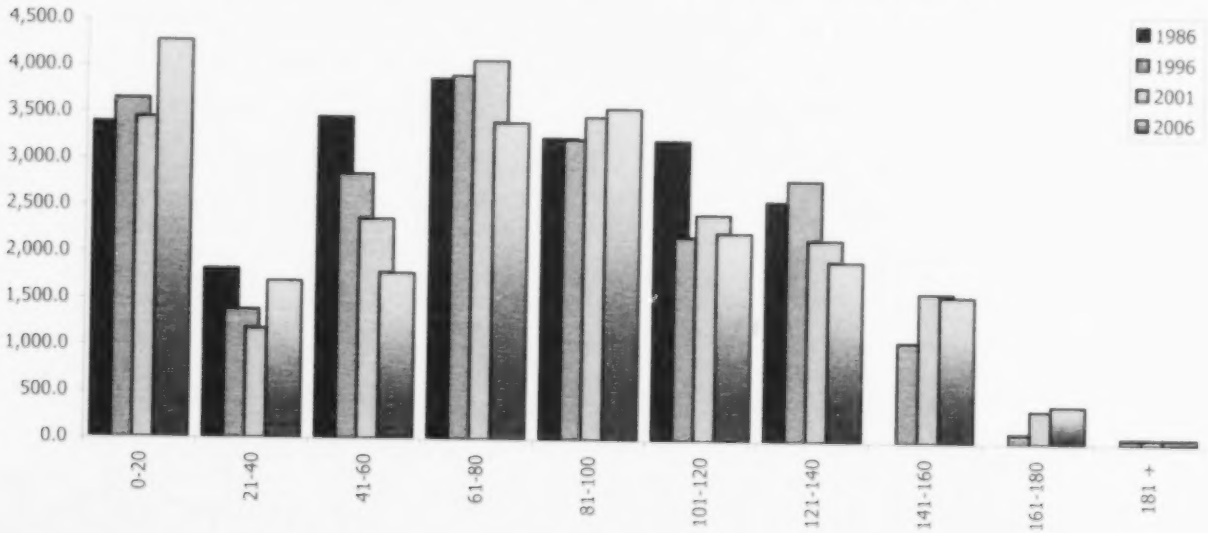
Softwood Working Groups

1986	1996	2001	2006
3,389.1	3,647.9	3,446.5	4,270.8
1,816.4	1,381.7	1,176.2	1,689.1
3,454.4	2,845.6	2,361.7	1,781.2
3,873.2	3,909.0	4,071.3	3,401.2
3,243.1	3,231.3	3,469.4	3,562.8
3,222.9	2,190.2	2,428.6	2,232.0
2,576.3	2,802.5	2,165.1	1,929.8
n/a	1,071.5	1,601.1	1,567.9
n/a	106.5	348.1	400.9
n/a	60.9	59.6	59.9
21,575.3	21,247.1	21,127.6	20,895.6

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - All Working Groups



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Softwood Working Groups



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

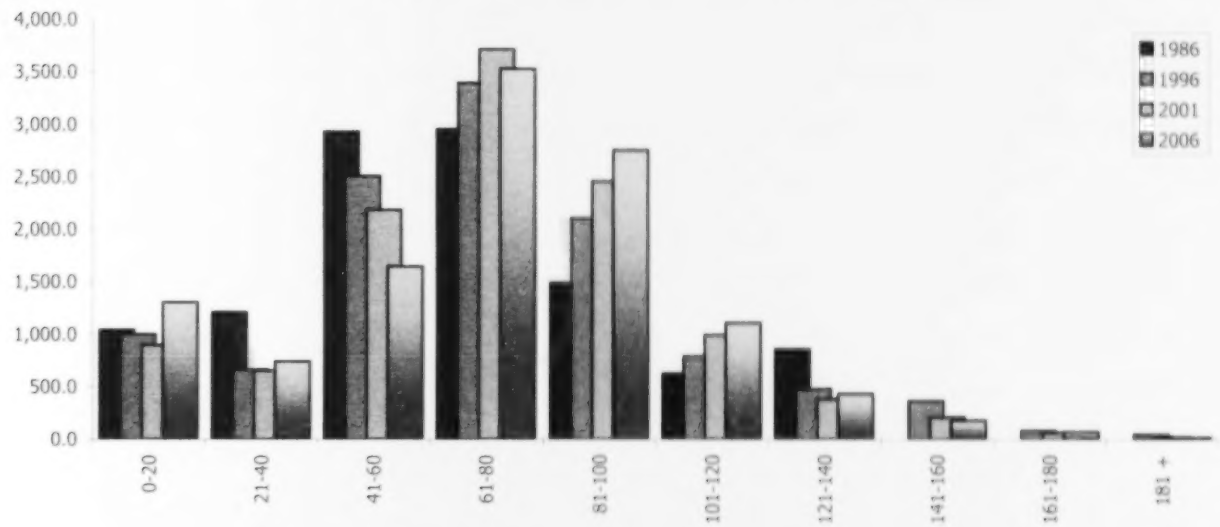
Hardwood Working Groups

Age Class	1986	1996	2001	2006
0-20	1,042.1	1,001.7	898.5	1,305.9
21-40	1,209.0	666.0	654.8	740.9
41-60	2,927.4	2,507.6	2,184.0	1,643.8
61-80	2,951.9	3,392.3	3,710.4	3,524.8
81-100	1,492.9	2,112.3	2,463.0	2,762.8
101-120	624.1	790.7	993.6	1,109.9
121-140	858.5	476.6	384.0	430.4
141-160	n/a	364.4	208.0	178.7
161-180	n/a	78.0	61.1	71.4
181 +	n/a	44.5	21.4	17.1
Total:	11,106.0	11,434.1	11,578.8	11,785.7

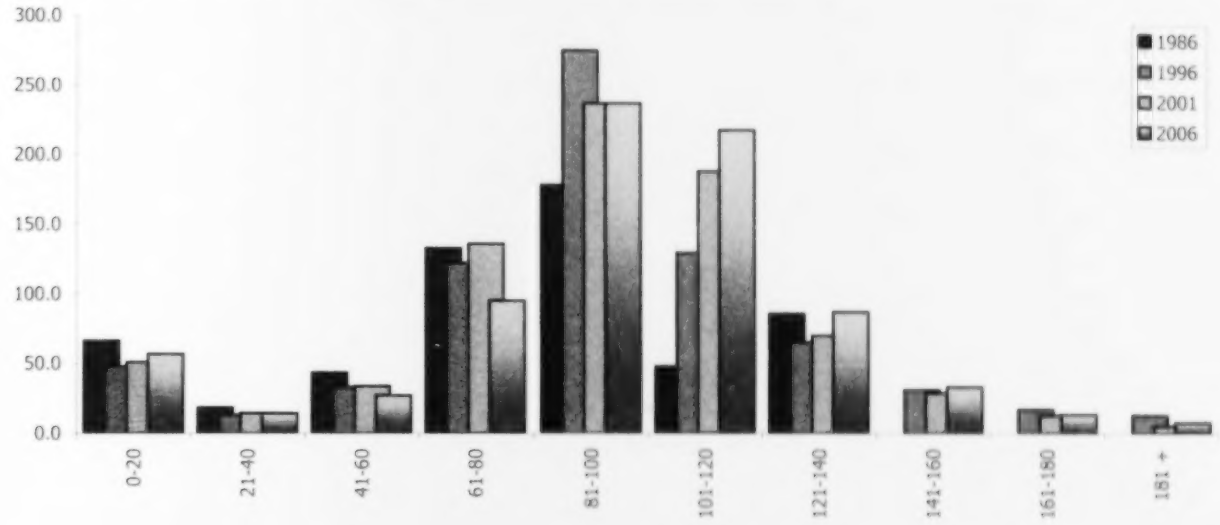
White Pine

1986	1996	2001	2006
66.2	47.8	51.0	56.8
18.4	13.2	14.6	14.3
43.5	33.2	33.8	27.1
132.9	122.5	136.1	95.2
177.5	273.9	236.0	236.1
47.3	128.7	187.3	216.8
85.3	64.8	69.6	86.4
n/a	30.6	28.6	32.9
n/a	16.8	12.7	13.3
n/a	12.6	5.4	7.6
571.0	744.1	775.2	786.5

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Hardwood Working Groups



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - White Pine



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

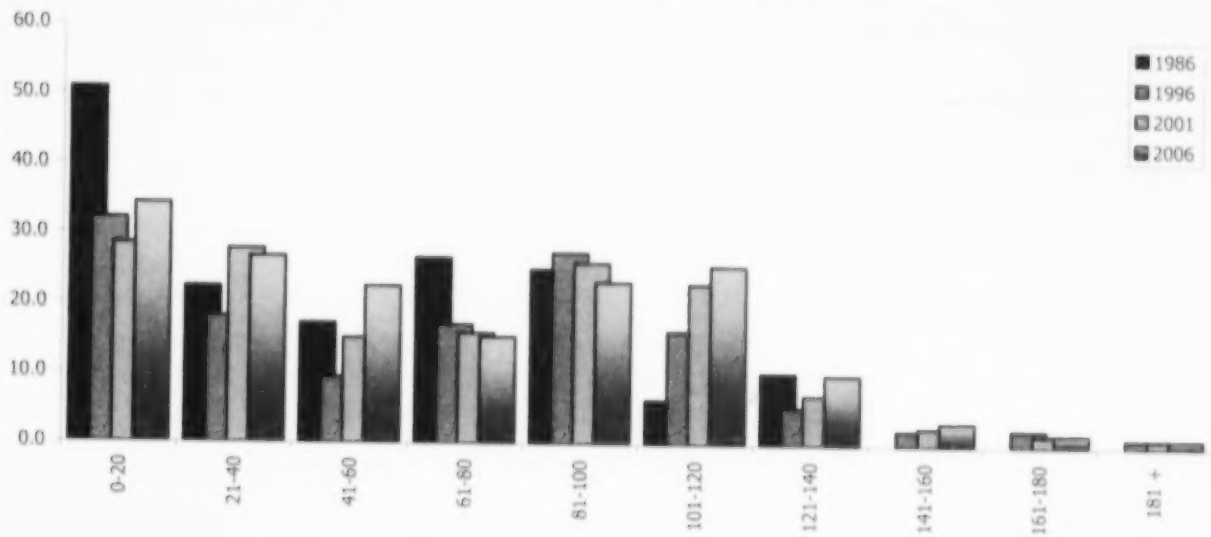
Red Pine

Age Class	1986	1996	2001	2006
0-20	50.9	32.2	28.6	34.3
21-40	22.4	18.1	27.8	26.8
41-60	17.2	9.4	15.1	22.5
61-80	26.5	17.0	15.8	15.3
81-100	24.9	27.4	25.9	23.2
101-120	6.3	16.1	22.9	25.5
121-140	10.2	5.4	7.1	10.0
141-160	n/a	2.1	2.5	3.3
161-180	n/a	2.3	1.7	1.8
181 +	n/a	1.1	1.1	1.2
Total:	158.4	131.2	148.5	163.7

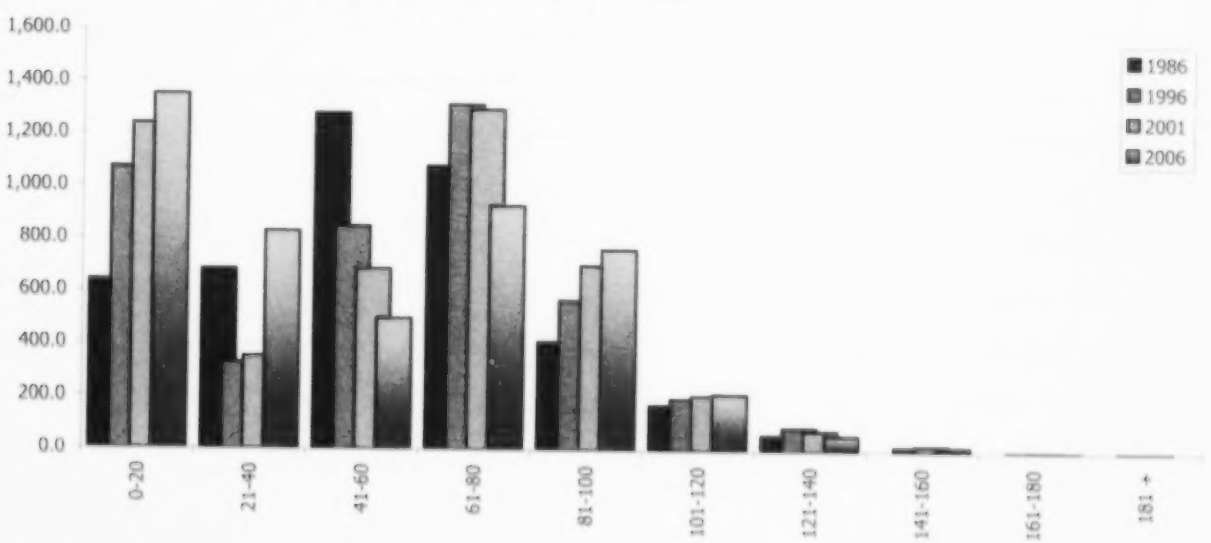
Jack Pine

1986	1996	2001	2006
639.6	1,071.9	1,237.9	1,350.9
682.8	326.7	351.5	827.8
1,279.5	847.5	686.1	497.4
1,079.3	1,314.5	1,295.9	927.5
410.1	567.7	700.6	762.4
169.7	194.5	206.5	212.2
58.2	85.8	74.7	57.8
n/a	15.3	20.4	15.1
n/a	1.3	1.7	1.2
n/a	0.7	1.5	0.4
4,319.1	4,426.0	4,576.8	4,652.7

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Red Pine



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Jack Pine



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

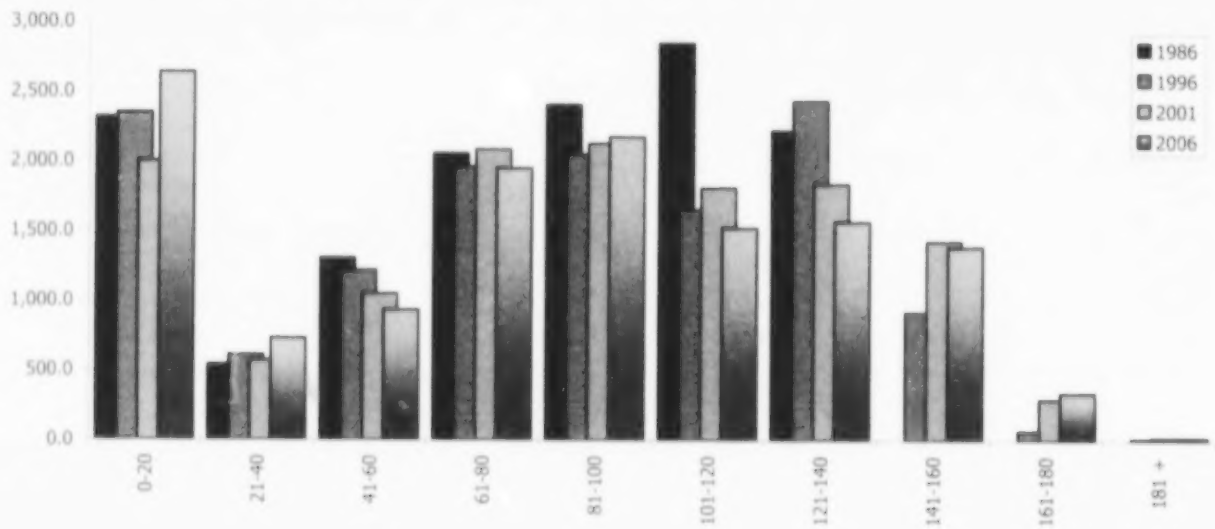
Spruce (All)

Age Class	1986 *	1996	2001	2006
0-20	2,316.0	2,346.4	2,001.6	2,637.2
21-40	537.4	606.2	570.6	726.9
41-60	1,301.0	1,213.1	1,045.9	929.6
61-80	2,053.0	1,959.3	2,082.4	1,947.4
81-100	2,402.4	2,046.9	2,124.5	2,171.8
101-120	2,843.8	1,650.8	1,806.0	1,517.8
121-140	2,217.4	2,428.3	1,833.8	1,563.0
141-160	n/a	912.5	1,420.5	1,381.3
161-180	n/a	62.6	288.7	335.5
181 +	n/a	11.2	19.2	18.9
Total:	13,670.9	13,237.3	13,193.1	13,229.5

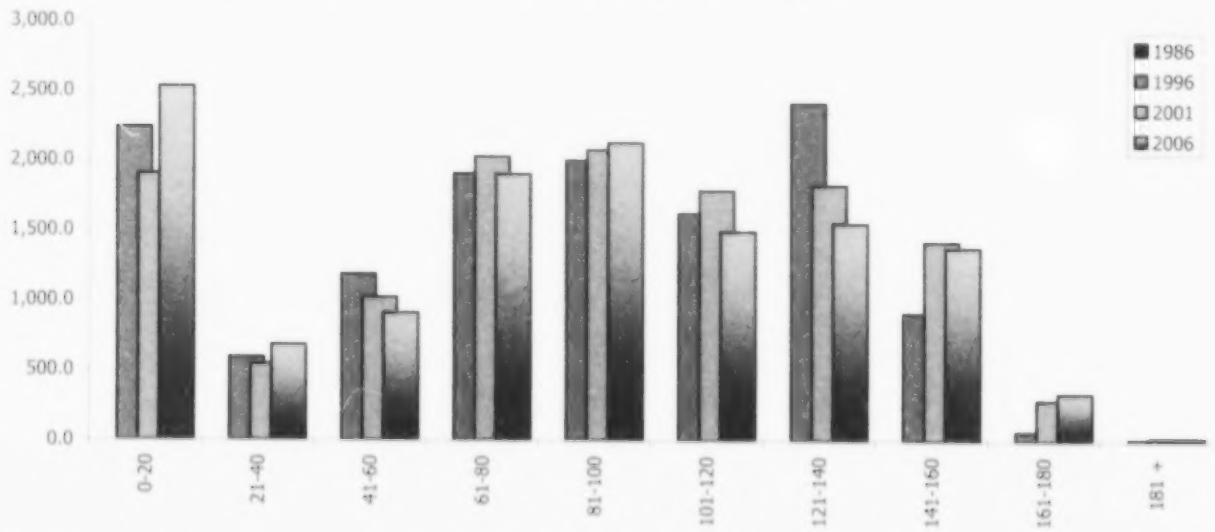
Black Spruce

1986	1996	2001	2006
n/a	2,236.2	1,904.6	2,527.0
n/a	587.6	541.9	678.2
n/a	1,182.6	1,018.0	905.4
n/a	1,904.8	2,024.8	1,901.0
n/a	1,995.9	2,074.1	2,125.5
n/a	1,618.9	1,782.0	1,489.5
n/a	2,409.2	1,822.3	1,549.5
n/a	908.0	1,417.0	1,375.7
n/a	61.0	287.0	334.2
n/a	11.1	19.0	18.6
n/a	12,915.1	12,890.7	12,904.5

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Spruce (All)



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Black Spruce



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

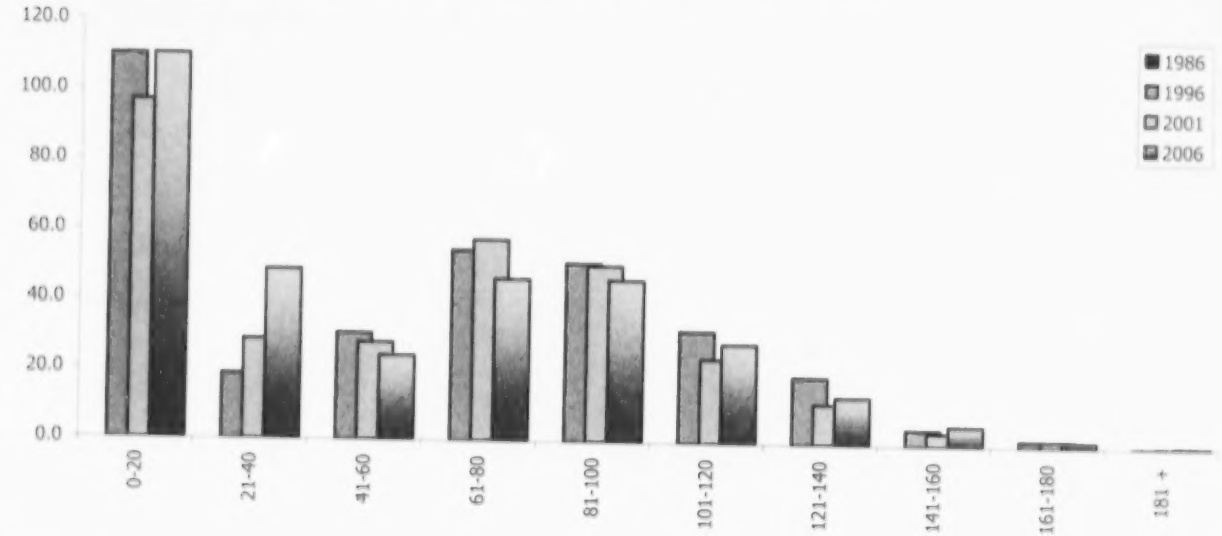
White Spruce

Age Class	1986	1996	2001	2006
0-20	n/a	110.2	97.0	110.3
21-40	n/a	18.6	28.6	48.7
41-60	n/a	30.5	27.9	24.2
61-80	n/a	54.5	57.5	46.4
81-100	n/a	51.0	50.4	46.3
101-120	n/a	31.9	24.0	28.3
121-140	n/a	19.1	11.6	13.5
141-160	n/a	4.5	3.5	5.6
161-180	n/a	1.6	1.6	1.4
181 +	n/a	0.1	0.2	0.3
Total:	n/a	322.1	302.4	325.0

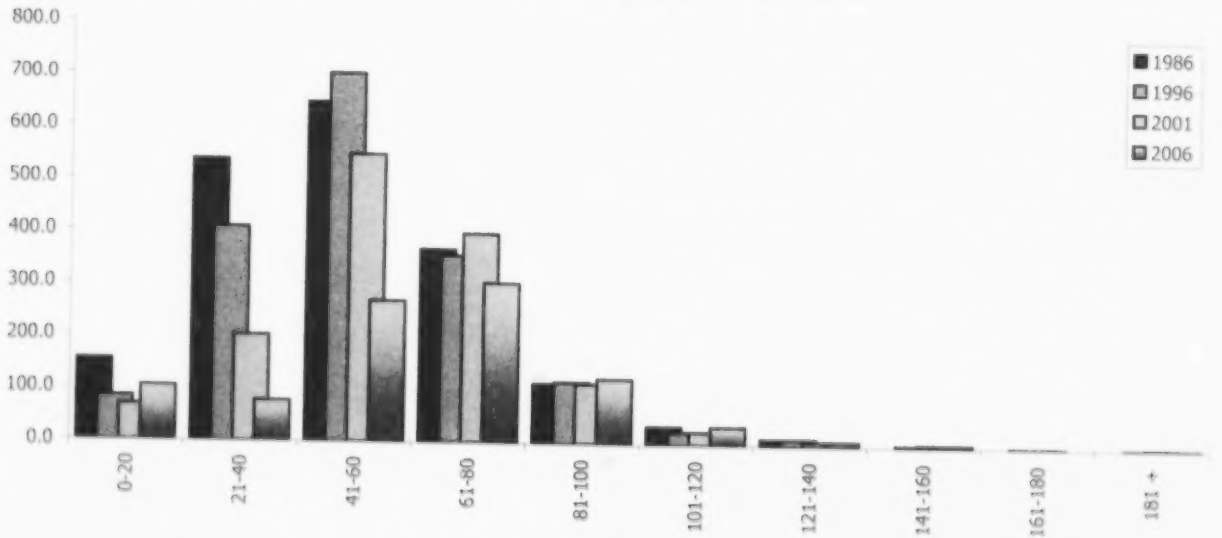
Balsam Fir

1986	1996	2001	2006
153.7	84.2	68.1	103.6
536.1	407.9	201.6	76.7
647.1	702.1	547.2	268.0
366.9	355.3	396.6	302.9
112.8	116.3	113.5	122.7
33.6	24.2	24.2	34.1
12.1	12.3	8.0	8.6
n/a	2.7	4.2	4.5
n/a	0.3	0.7	0.3
n/a	0.5	1.0	0.4
1,862.4	1,705.8	1,365.1	921.8

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - White Spruce



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Balsam Fir



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

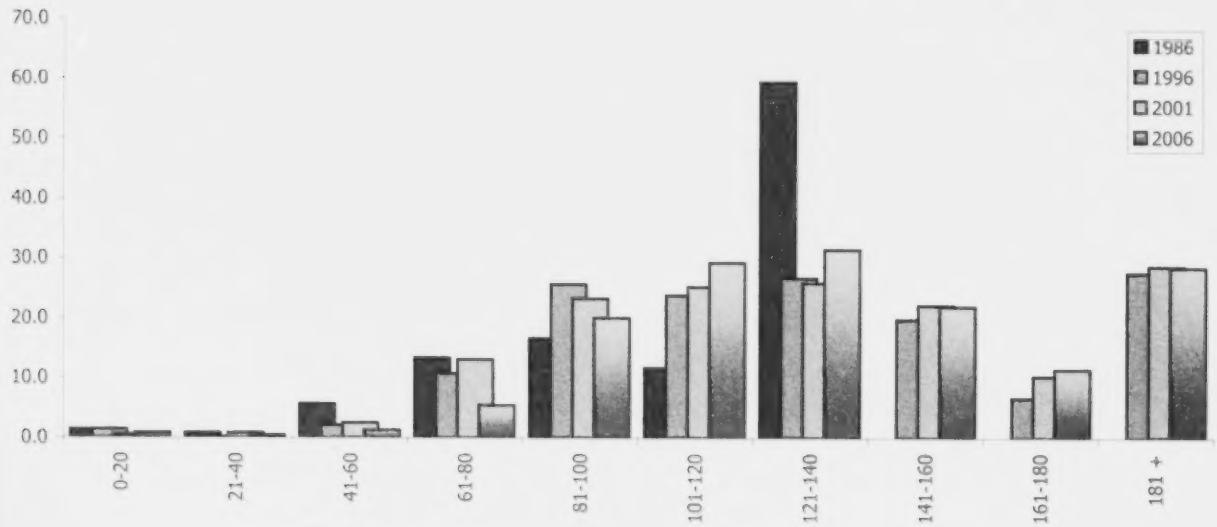
Hemlock

Age Class	1986	1996	2001	2006
0-20	1.3	1.4	0.5	0.8
21-40	0.8	0.2	0.7	0.4
41-60	5.6	2.1	2.5	1.2
61-80	13.3	10.7	13.0	5.3
81-100	16.5	25.6	23.2	19.9
101-120	11.6	23.7	25.1	29.2
121-140	59.3	26.6	25.8	31.3
141-160	n/a	19.6	22.0	21.9
161-180	n/a	6.6	10.2	11.4
181 +	n/a	27.5	28.5	28.3
Total:	108.4	143.9	151.6	149.7

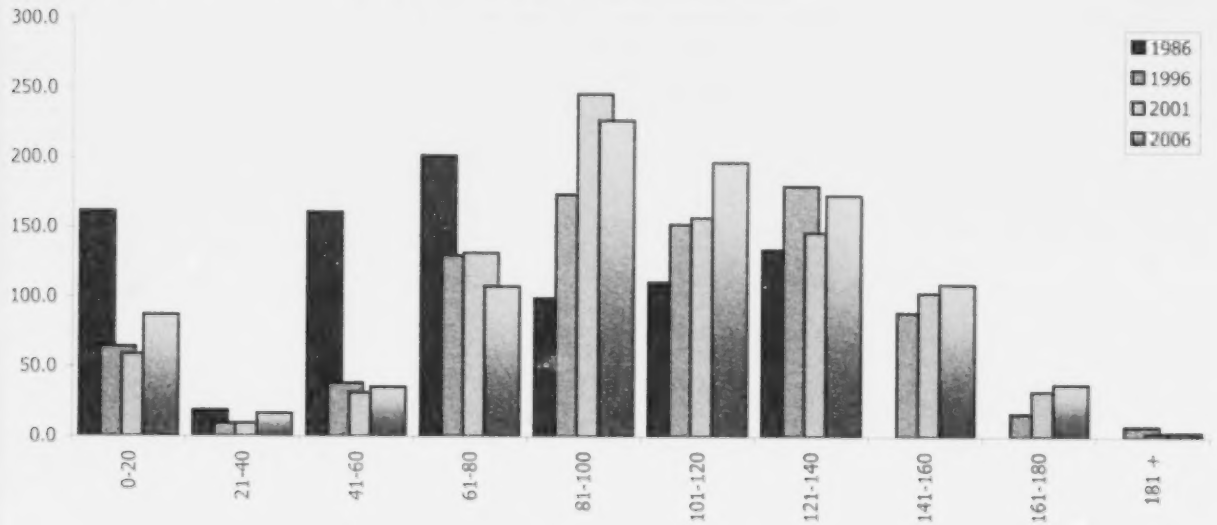
Other Conifers

1986	1996	2001 *	2006
161.4	64.1	58.8	87.1
18.6	9.3	9.4	16.3
160.6	38.2	31.2	35.4
201.2	129.6	131.4	107.6
98.9	173.6	245.7	226.6
110.5	152.1	156.7	196.4
133.8	179.3	146.1	172.6
n/a	88.7	102.8	109.0
n/a	16.6	32.3	37.5
n/a	7.4	2.8	3.1
885.0	858.9	917.2	991.6

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Hemlock



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Other Conifers



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

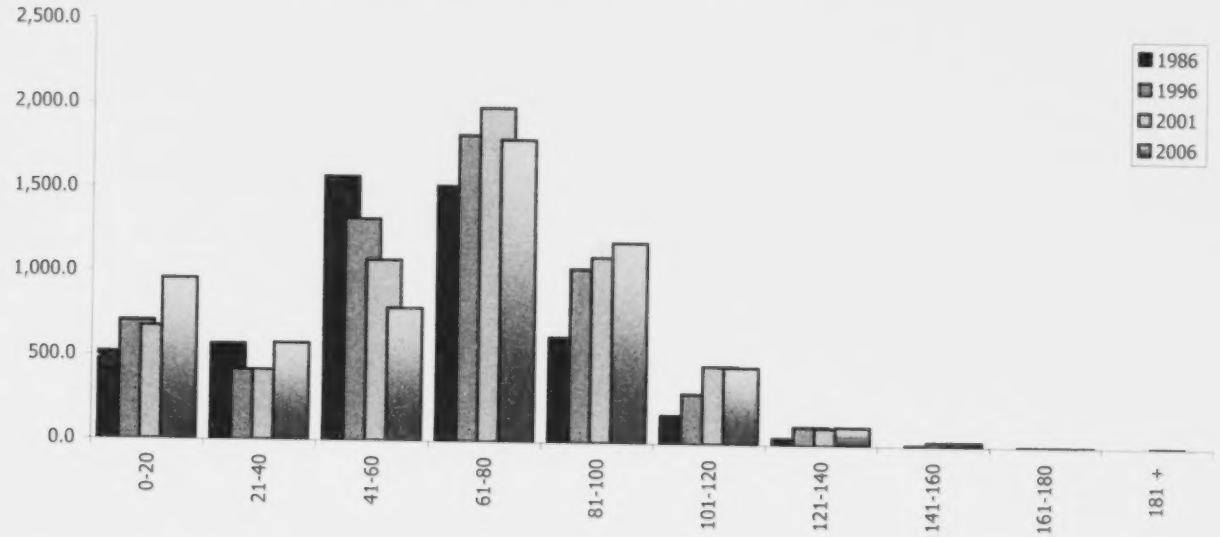
Poplar

Age Class	1986	1996	2001	2006
0-20	519.3	707.1	675.2	958.2
21-40	570.0	416.9	416.6	577.3
41-60	1,570.2	1,319.3	1,075.1	788.1
61-80	1,519.5	1,822.7	1,986.7	1,798.3
81-100	624.6	1,032.3	1,103.2	1,191.3
101-120	167.9	296.7	460.9	456.4
121-140	40.5	109.1	102.0	107.8
141-160	n/a	7.6	23.5	25.2
161-180	n/a	1.0	1.5	1.3
181 +	n/a	0.2	2.2	0.5
Total:	5,012.0	5,712.8	5,846.8	5,904.4

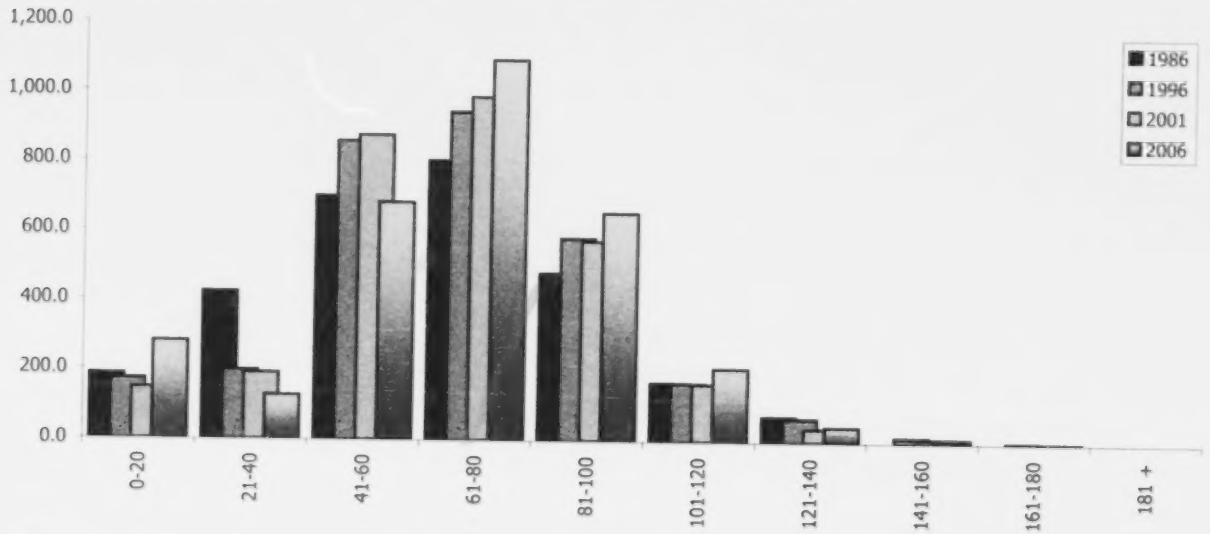
White Birch

1986	1996	2001	2006
185.7	172.2	147.4	280.3
422.9	198.1	190.4	126.8
698.7	856.4	873.5	681.0
802.0	941.7	984.1	1,091.0
480.0	580.2	572.4	652.8
167.2	166.6	164.3	209.2
72.5	67.8	39.6	44.1
n/a	15.8	11.3	11.2
n/a	2.1	1.2	0.9
n/a	0.2	0.3	0.3
2,829.0	3,001.0	2,984.6	3,097.5

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Poplar



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - White Birch



* *1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

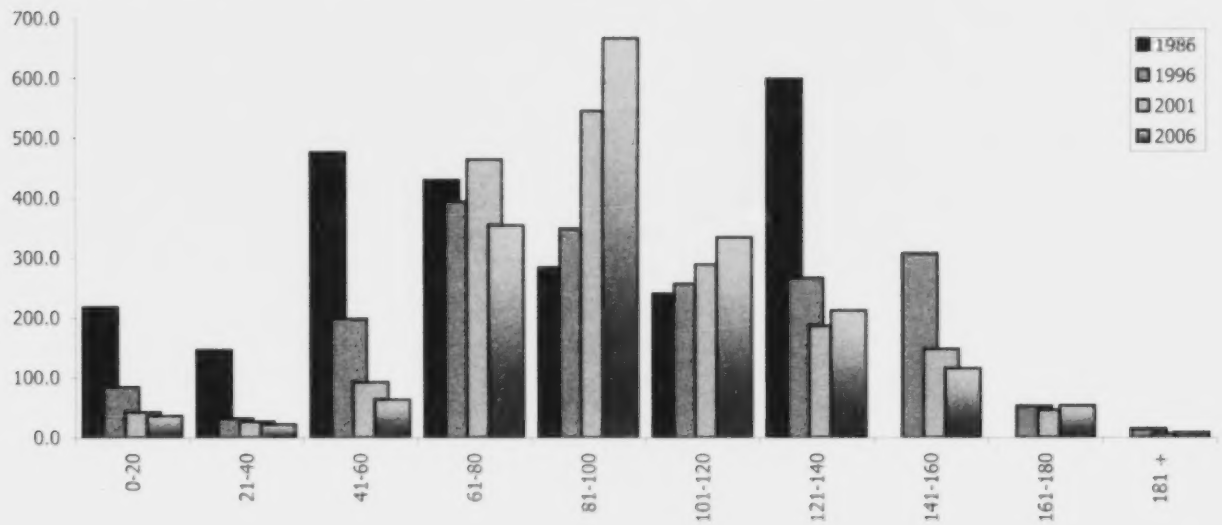
Hard Maple

Age Class	1986	1996	2001	2006
0-20	218.2	84.7	42.9	36.6
21-40	146.1	32.4	27.0	22.5
41-60	476.2	198.6	92.5	63.5
61-80	430.0	393.8	464.1	354.3
81-100	284.1	348.7	544.6	665.6
101-120	240.0	256.6	288.5	333.7
121-140	597.4	266.2	186.2	211.6
141-160	n/a	306.7	147.9	115.6
161-180	n/a	52.6	45.8	53.4
181 +	n/a	14.7	7.3	8.3
Total:	2,391.9	1,955.0	1,846.8	1,865.2

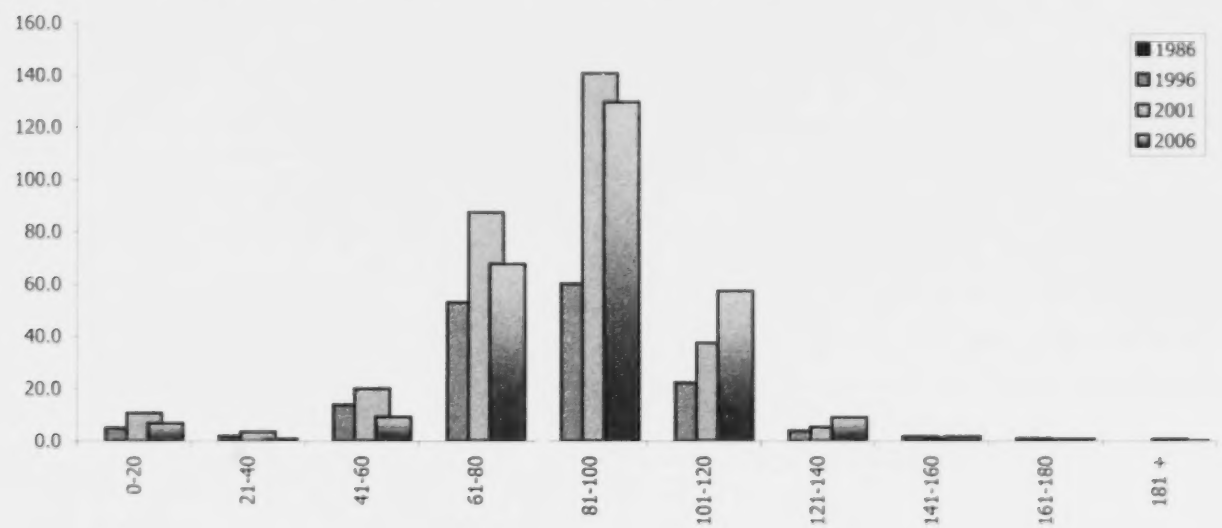
Red Oak

1986	1996	2001	2006
n/a	5.0	10.7	6.8
n/a	1.9	3.5	0.8
n/a	13.9	19.9	9.2
n/a	52.9	87.3	67.6
n/a	60.0	140.5	129.6
n/a	22.2	37.3	57.2
n/a	3.8	5.2	9.0
n/a	1.7	1.2	1.7
n/a	0.9	0.5	0.6
n/a	0.0	0.6	0.1
n/a	162.3	306.8	282.5

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Hard Maple



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Red Oak



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

6.2 - Historical Working Group Summaries - AOU

Area in thousands of hectares

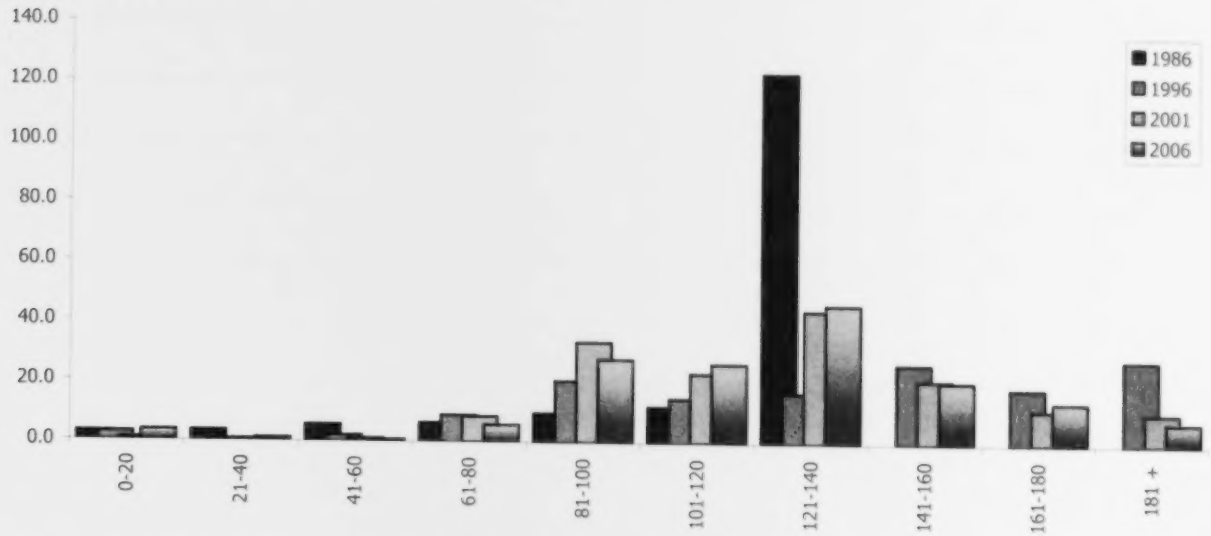
Yellow Birch

Age Class	1986	1996	2001	2006
0-20	2.9	2.8	0.9	3.5
21-40	3.4	0.5	0.7	1.0
41-60	5.5	2.0	1.1	0.7
61-80	6.3	8.9	8.4	5.7
81-100	9.6	20.4	33.4	27.6
101-120	12.0	14.7	23.0	26.3
121-140	123.2	16.7	44.0	46.0
141-160	n/a	26.4	21.0	20.6
161-180	n/a	18.4	11.4	14.0
181 +	n/a	28.0	10.5	7.5
Total:	162.9	139.0	154.4	153.1

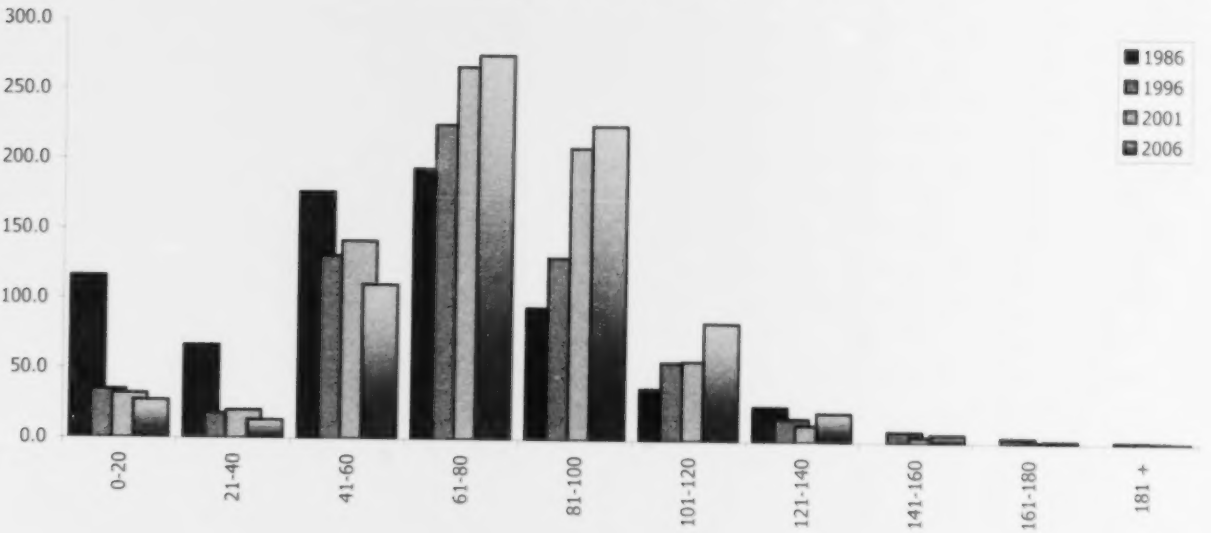
Other Hardwoods

1986	1996	2001	2006
116.0	34.9	32.1	27.2
66.6	18.0	20.1	13.3
176.9	131.2	141.9	110.5
194.0	225.3	267.0	275.5
94.7	130.7	209.4	225.5
37.1	56.2	56.9	84.3
24.9	16.8	12.1	20.9
n/a	7.9	4.3	6.1
n/a	3.9	1.3	1.9
n/a	1.4	1.0	0.5
710.1	626.3	746.1	765.5

Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Yellow Birch



Working Group Area by 20 Year Age Class by Inventory Rollup Year (AOU) - Other Hardwoods



** 1986 Data groups all age classes older than 120 years in the 121-140 age class*

7 – Landscape Pattern Indices

Landscape ecology is based on the idea that patterns exist within and influence nature (Turner 1989). Wildlife habitat based on spatial arrangement of forest or nonforest classes is sensitive to these patterns. Changes in landscape patterns can be both natural or man made, as well as either short or long term in nature. A forest fire or harvest will change the pattern within an area of forest, but will be followed by the establishment of young trees and the disturbed area will eventually become mature forest again. Conversely, an area of forest that is converted to urban uses or agriculture tends to be a much more permanent change. These concepts influence the classes used to measure landscape pattern in this chapter.

7.1 Landscape Metrics

Landscape pattern indices, or measurements of pattern, were calculated for the 2001 version of the Forest Resource of Ontario. Statistics were calculated based on the Landsat 5 satellite imagery available at that time, developed from a 1992 to 1998 mosaic. This report utilizes Landsat 7 satellite imagery, developed from a 2000 to 2002 mosaic.

These two image sets are referred to as Landcover 1998 and Landcover 2002 for the purposes of this chapter. Although very similar, the landscape metrics derived from these two satellite images are not comparable due to differences such as classification schemes, resolution and accuracy. Dramatic differences occur in areas that have had little or no disturbance, due to the increased resolution and complexity of the Landsat 7 data. Differences between the two imagery sets are documented in Chapter 8.

The indices in this chapter were calculated both for ecoregions, and for portions of an ecoregion. These portions were based on a

Landscape Patches - Agriculture and Forest Patches in Southern Ontario

10,000 hectare hexagon grid. Hexagon results show variation within a site region, rather than a single value, and yields a detailed map for viewing each index. Each index profile illustrates results, for several land classes by site region, as well as hexagon results for administrative zones and a provincial average.

Fragmentation and diversity indices yield different results depending on the question asked, and to provide as comprehensive analysis as possible, three main groupings of land classes were analyzed.

The land class sets used for the analysis are:

- Simple Forest (non-forest, forest and non-productive forest combined, agriculture & field, disturbance)
- Simple Productive Forest (non-forest, productive forest, agriculture & field, disturbance)
- Low complexity forest (non-forest, dense hardwood forest, dense softwood forest, sparse forest, mixed forest, disturbance)

The metrics calculated for each class and class set (and landscape) are:

- Mean patch size (MPS)
- Patch size coefficient of variation (PSCOV)
- Edge density (ED)
- Complexity or shape index (MSI)
- Shannon's Diversity Index (SDI)
- Shannon's Evenness Index (SEI)
- Interspersion (IJI)
- Isolation distance or Mean Nearest Neighbour (MNN)
- Total Core Area Index (TCAI)

Landscape metrics definitions, as well as some common terminology for this chapter are listed below, and the actual metrics are highlighted in the following pages with example metric maps based on the 10,000 hectare hexagon snapshot of the province.

Definitions

- **Landscape:** A landscape is the total area under analysis, and is the sum of all patches in the landscape. In the example map 7.2, it is the entire 163 hectare area in Southern Ontario (1.4 km by 1.4 km). This is a very small area used for illustrative purposes.

- **Class:** A class is made up of all patches in a landscape that have the same value, such as the forest class or agriculture class in the example map 7.2. Each of the 4 classes has a distinct colour in the bottom map.

- **Patch:** Each individual group of identical class values is a patch. In the example map there are nine patches; four forest patches, two patches of agriculture, two patches of non-forest and one patch of young forest.

Landscape Metrics Definitions and Results:

Mean Patch Size (MPS)

Mean patch size is the total landscape area divided by the number of patches, and is expressed in hectares.

Mean patch size landscape fragments are an important piece of information relating to fragmentation. A landscape with a smaller patch size than another might be considered more fragmented. It should be noted that this is only a statistical mean and variation in patch size (Patch Size Coefficient of Variation PSCOV) should also be used to interpret patch structure.

In the example map 7.2, mean patch size is easily calculated and demonstrates the simplicity of this metric. The mean patch size for forest in this example is 11.0 hectares.

Mean patch size varies provincially, and can vary greatly by class. In the far north, the mean patch size for landscape features is quite high, but is generally very low for productive forest (as displayed in the map in 7.4 – MPS). This reflects large areas of non-forest (tundra and bog) and small fragmented patches of forest. Within the AOU, MPS for forests is much higher than that of the extreme north and southern portions of the province. Fire suppression and management practices within the AOU have contributed to the dramatic increase in patch size when compared to the northern boreal forest. Mean patch size for the disturbed forest class reflects this as well, and is more than twice the value of the AOU.

Patch Size Coefficient of Variation (PSCOV)

Patch Size Coefficient of Variation is an expression of the standard deviation in patch size (PSSD) divided by the mean patch size (MPS), multiplied by 100 (to convert to percent). This translates to variability in patch size relative to mean patch size.

In the example map, patch size coefficient of variation is quite variable where there are several classes. Landscape values in patch size range from 0.7 to 73.5 hectares, so the high value for the landscape is obvious. Forest class PSCOV varies nearly as much, with four patches ranging from 0.7 to 24.4 hectares. There is no variation in young forest patch size, as there is only one patch.

PSCOV demonstrates much less variance than mean patch size, ranging from 626 to 806% when looking at the 10,000 hectare landscape mosaic. When comparing site regional values however, there can be a great difference in values between the far north and the AOU, similar to the difference found in mean patch size.

Edge Density (ED)

Edge density is an expression of the length of edge in a landscape divided by the total area of that landscape (metres of edge per hectare of landscape).

Edge density is an important factor in assessing wildlife habitat. Many species of songbirds for example require a complex landscape of edges between forest classes and disturbance as part of their preferred habitat. An increase in edge however is not simply better for all wildlife, as some species require large interior forest patches.

Edge density is a critical component of any study of fragmentation, as most of the adverse effects of forest fragmentation on wildlife appear to be related in some way to edge effects.

In the example map, the forest class has a much higher edge density when compared to the block of young forest, mostly because of the complexity of the forest patches.

Provincially, edge density for forests is highest in those areas that have a very fragmented nature, such as site region 2W, which has a very complicated mix of forest and disturbed forest caused by fire.

Mean Shape Index (MSI)

Mean Shape Index is a measure of shape complexity. Mathematically, MSI is an expression of the sum of the patch perimeter (in metres) divided by the square root of patch area (m^2) for each patch in the landscape, adjusted for a square standard, divided by the number of patches.

The more complex a shape or patch, the higher the value will be. In the example map, young forest is a relatively simple shape, and therefore has the lowest value. The more complex non-forest patches have the highest value.

Provincially, MSI for the forest class ranges from low values in the far north (site regions 0E and 1E), to a gradual increase through to the southern extent of the AOU (site region 5E). MSI drops dramatically in site region 6E and 7E for the forest class. Landscape values for MSI follow a similar pattern, with much less variability than the forest class.

Shannon's Diversity Index (SDI)

Shannon's Diversity Index is a measure of species or class diversity within an ecosystem. Mathematically, SDI is an expression of the proportional abundance of each patch type multiplied by that proportion. For example, in a landscape that only included one patch (i.e. no diversity), the SDI would be 0. SDI is only calculated for the entire landscape, not individual classes. In the example map, SDI is 1.14.

Provincially, the highest diversity indices occur in site regions 2W and 6E, where the forest class and non-forest classes have a relatively equal distribution. Within the Great Lakes-St. Lawrence Forest region, SDI is dramatically lower, due to a landscape dominated by hardwood forest.

Shannon's Evenness Index (SEI)

Shannon's Evenness Index is a measure of patch distribution and abundance, or a measure of the distribution of area within patch types. Mathematically, SEI is an expression of the proportional abundance of each patch type multiplied by that proportion, divided by the logarithm of the number of patch types. In other words, the observed Shannon's Diversity Index divided by the maximum Shannon's Diversity Index for that number of patch types. SEI is only calculated for the entire landscape, not individual classes. In the example map this value is 0.82.

Provincially, SEI ranges from very low values in site regions 0E, 1E and 2E, and increases when forest cover occurs, through to site region 5E.

Interspersion Juxtaposition Index (IJI)

Interspersion Juxtaposition Index is a measure of patch adjacency or an expression of the observed interspersion over the maximum possible interspersion for the given number of patch types. Mathematically, it is minus the sum of the length (m) of each unique edge type divided by the total landscape edge (m), multiplied by the logarithm of the same quantity, summed over each unique edge type; divided by the logarithm of the number of patch types times the number of patch types minus 1 divided by 2; multiplied by 100 (to convert to a percentage).

Provincial interspersion values range from very low in the far north to very high in the forested areas within the boreal forest. Southern Ontario has a very high IJI value, as a result of the mix of agriculture, nonforest and forest patches, as in the example map.

Mean Nearest Neighbour (MNN)

Mean Nearest Neighbour is a measure of patch isolation, or the measure of the shortest distance to a similar patch. This metric is an indication of forest connectedness. Mathematically, MNN is an expression of the sum of the distance (m) to the nearest patch of the same type, based on nearest edge-to-edge distance, for each patch in the landscape with a neighbour, divided by the number of patches with a neighbour. In the example map, MNN is highest for non-forest, which has the highest degree of separation, and lowest for forest which occurs more centrally within the map.

Provincially, this metric displays a dramatically different result than mean patch size. Site regions with less forest in the far north (0E, 1E, 2E) and the south (6E, 7E) have the highest values for MNN, indicating the largest distance between forest patches. The lowest values for MNN occur in the clay belt (3E), and the Great Lakes-St. Lawrence forest region (4E and 5E), where large patch sizes of forest occur.

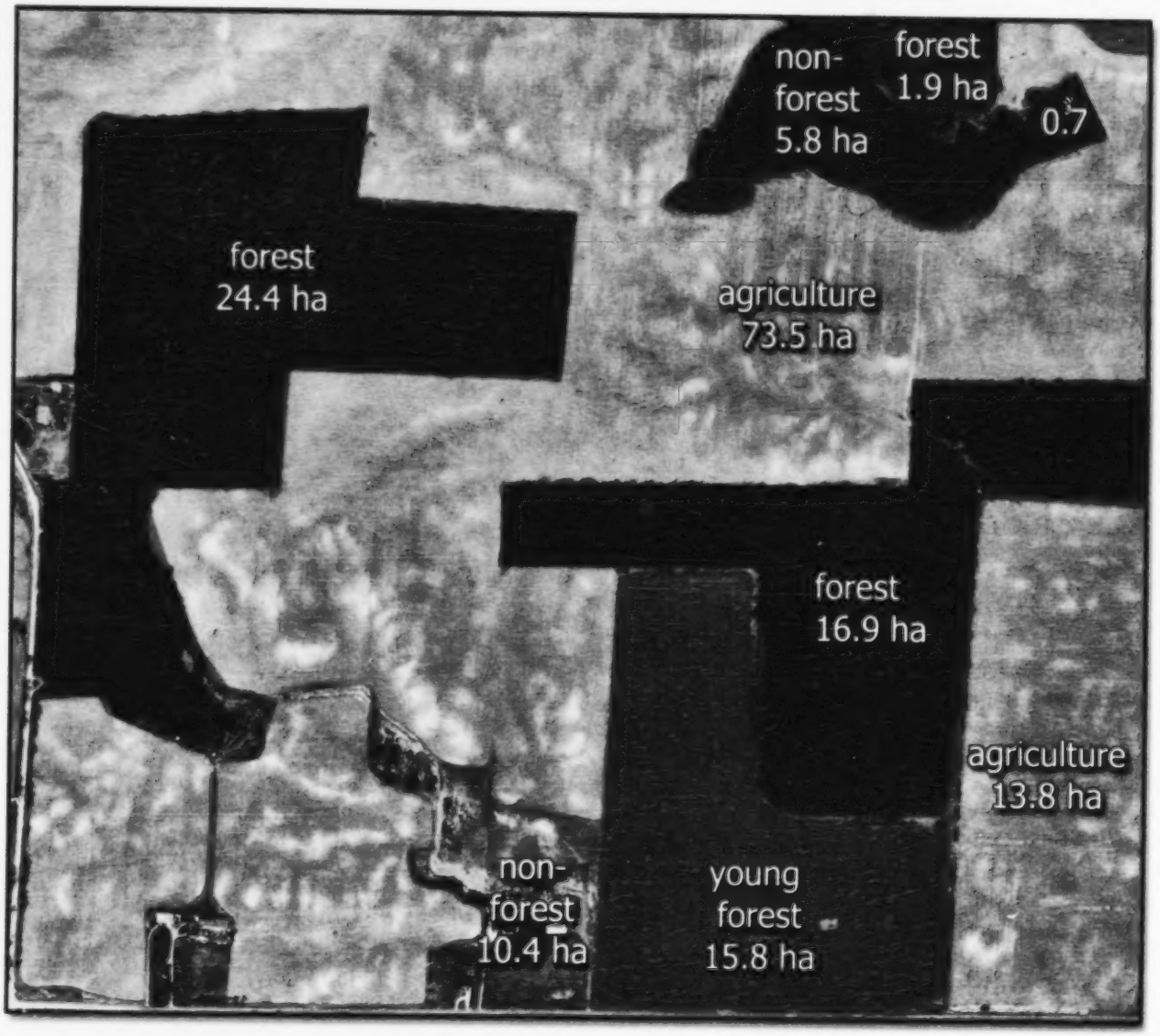
Total Core Area Index (TCAI)

Total Core Area Index is a measure of core area, or forest interior. Mathematically, TCAI is an expression of the sum of the core areas of each patch, divided by the total landscape area, multiplied by 100 (to convert to a percentage). TCAI equals the percentage of the landscape that is core area.

In the example map, TCAI for forest is 27.0, and non-forest is 8.1, illustrating the proportion of those classes that are defined as core area.

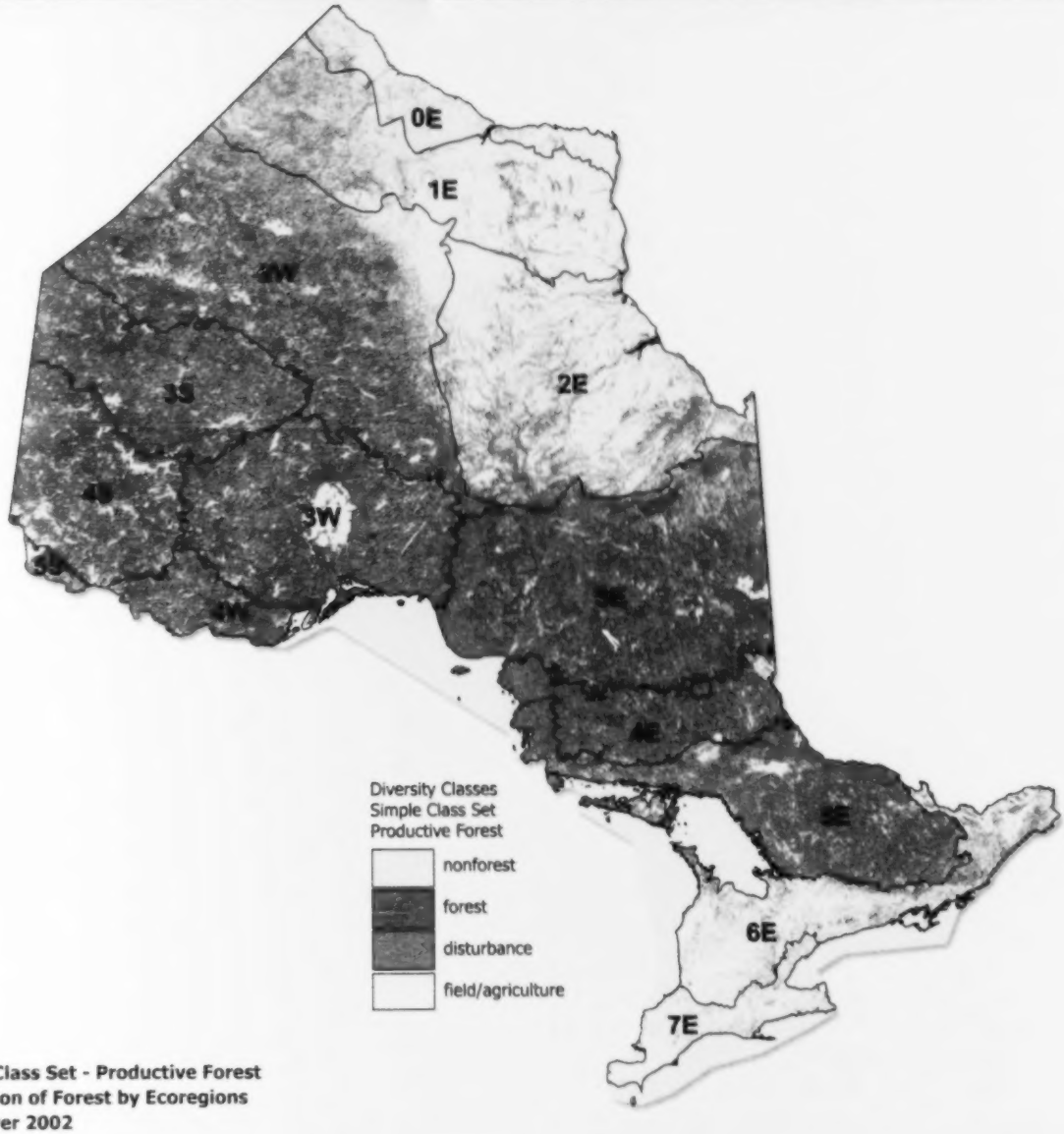
Provincially, TCAI increases as forest cover increases, having the lowest values in site regions 0E, 1E and 2E, and the highest values in the AOU, 2W through to 5E.

Example Map



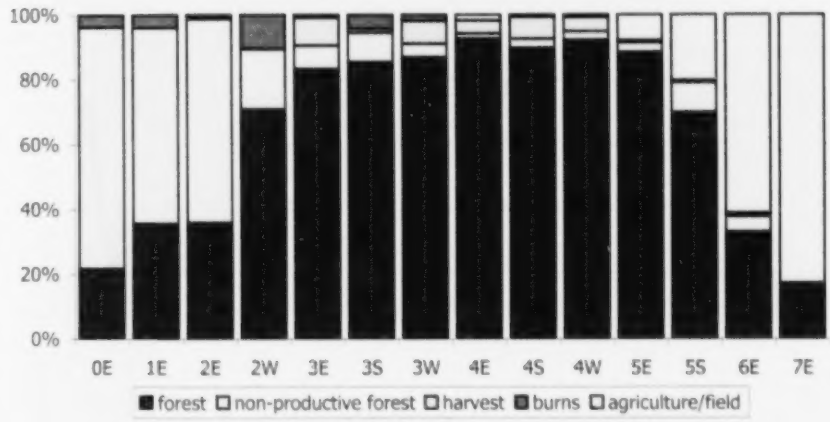
Example Map
~1.4 km x 1.4 km image of Rural Southern Ontario

Metric	Landscape	Non-forest	Forest	Young Forest	Agriculture/ Field
Number of Polygons	9	2	4	1	2
Mean patch size (MPS) ha	18.1	8.1	11.0	15.8	43.6
Patch size coefficient of variation (PSCOV)	115.0	28.4	91.6	-	68.4
Total Edge (TE) m/ha	16,028	6,016	7,162	2,002	11,754
Edge density (ED)	98.3	36.9	43.9	12.3	72.1
Complexity or shape index (MSI)	1.84	2.54	1.53	1.26	2.04
Shannon's Diversity Index (SDI)	1.14	-	-	-	-
Shannon's Evenness Index (SEI)	0.82	-	-	-	-
Total Core Area (TCA) ha	139.8	11.3	37.7	13.9	76.9
Total Core Area Index (TCAI)	100.0	8.1	27.0	9.9	55.0
Isolation distance or Mean Nearest Neighbour (MNN)	228.5	683.1	71.7	-	87.5
Interspersion (IJI)	75.0	65.6	67.1	92.8	79.2



Simple Class Set - Productive Forest
Proportion of Forest by Ecoregions
Landcover 2002

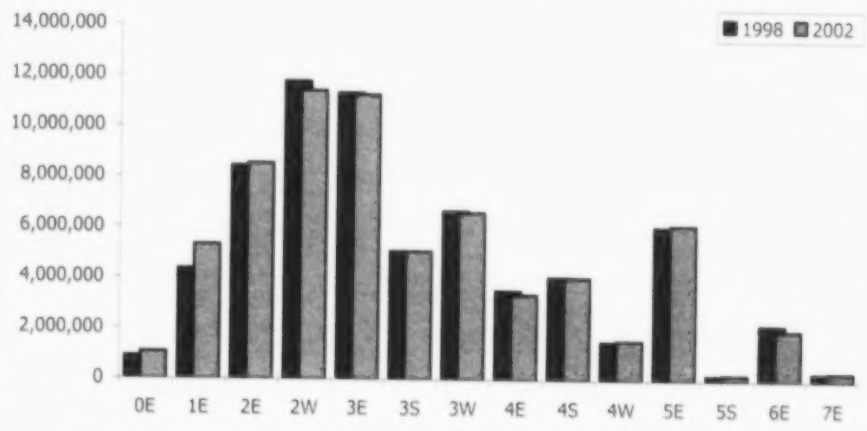
Site Region	Total Forest	Disturbed Forest
0E	37.0%	1.4%
1E	56.0%	2.3%
2E	68.0%	0.8%
2W	69.9%	8.3%
3E	82.2%	8.3%
3S	76.4%	4.5%
3W	74.1%	7.3%
4E	82.2%	3.5%
4S	67.7%	5.2%
4W	76.8%	3.8%
5E	76.1%	0.6%
5S	65.9%	0.5%
6E	34.3%	1.0%
7E	14.5%	0.4%



Total Area Comparison - Land Class Area by Ecoregions

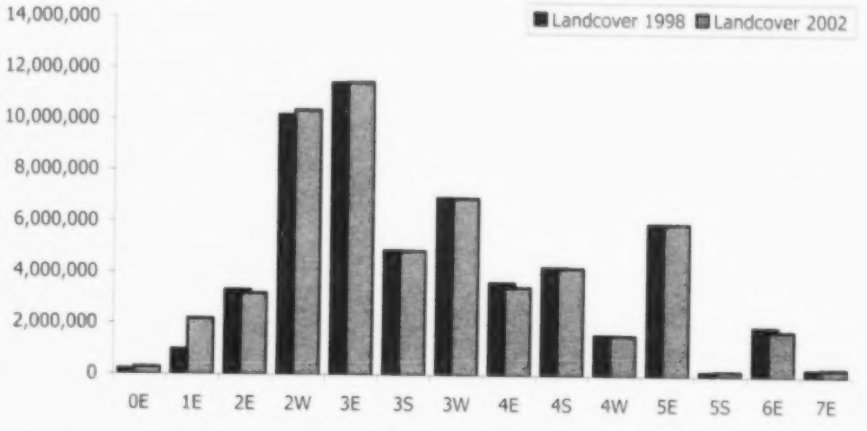
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Total Area (thousands of hectares)

Site Region	Landcover 1998	Landcover 2002
0E	881.9	1,064.2
1E	4,348.9	5,311.9
2E	8,422.4	8,530.0
2W	11,765.5	11,392.0
3E	11,306.5	11,240.9
3S	5,056.3	5,058.0
3W	6,647.6	6,591.0
4E	3,508.5	3,370.6
4S	4,049.9	4,033.9
4W	1,503.7	1,557.1
5E	6,042.4	6,121.6
5S	187.8	221.9
6E	2,181.5	1,976.2
7E	288.1	322.7



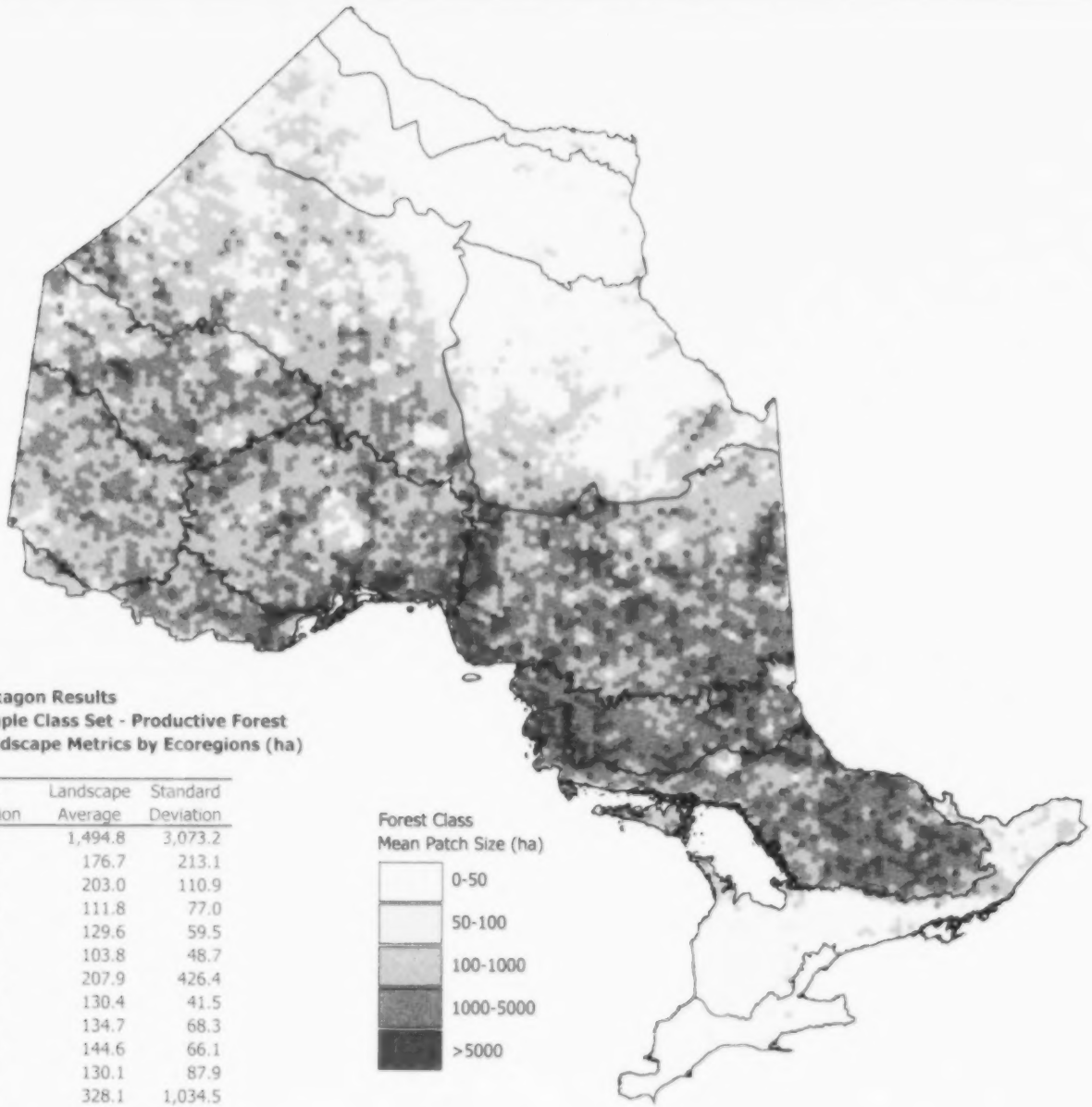
Simple Class Set - Productive Forest and Disturbances - Landcover 1998 vs. 2002 - Total Area (thousands of hectares)

Site Region	Landcover 1998	Landcover 2002
0E	200.7	281.4
1E	967.3	2,183.6
2E	3,320.4	3,195.0
2W	10,180.4	10,370.6
3E	11,439.5	11,478.7
3S	4,876.9	4,870.5
3W	6,960.9	6,940.5
4E	3,623.1	3,459.4
4S	4,246.6	4,220.8
4W	1,594.3	1,590.5
5E	5,957.5	5,968.2
5S	165.5	197.5
6E	1,924.7	1,779.0
7E	278.2	309.3



Simple Class Set - Productive Forest - Landcover 1998 vs. 2002 - Total Area (thousands of hectares)

	Landcover 1998				Landcover 2002				
Site Region	Forest	Disturbance (Burns)	Disturbance (Harvest)	Field & Agriculture	Forest	Disturbance (Burns)	Disturbance (Harvest)	Disturbance Total	Field & Agriculture
0E	145.6	55.1	0.0	0.0	239.9	41.5	0.0	41.5	0.0
1E	841.2	126.2	0.0	0.0	1,966.4	217.2	0.0	217.2	0.0
2E	3,240.4	61.4	18.6	0.0	3,090.4	102.2	2.4	104.6	0.0
2W	9,133.7	1,035.6	11.1	0.0	9,022.8	1,318.4	29.3	1,347.7	0.0
3E	10,180.6	39.5	1,219.3	2.3	10,341.0	67.6	1,070.1	1,137.8	40.9
3S	4,548.3	283.8	44.8	0.0	4,573.5	229.1	67.8	297.0	0.0
3W	6,267.6	96.3	597.0	5.0	6,289.8	142.0	508.7	650.7	0.0
4E	3,460.0	1.1	162.0	142.0	3,314.1	1.2	144.0	145.3	62.4
4S	3,922.2	38.6	285.8	1.1	3,910.5	15.9	294.4	310.3	14.7
4W	1,454.3	23.9	116.1	27.4	1,513.9	4.6	72.0	76.6	8.8
5E	5,875.8	0.4	81.3	207.2	5,924.0	0.5	43.7	44.3	536.4
5S	163.1	0.0	2.5	92.1	195.8	0.0	1.7	1.7	57.1
6E	1,924.4	0.0	0.3	3,680.3	1,724.0	28.6	26.4	55.0	3,210.2
7E	278.2	0.0	0.0	1,701.1	301.2	3.8	4.2	8.0	1,603.8

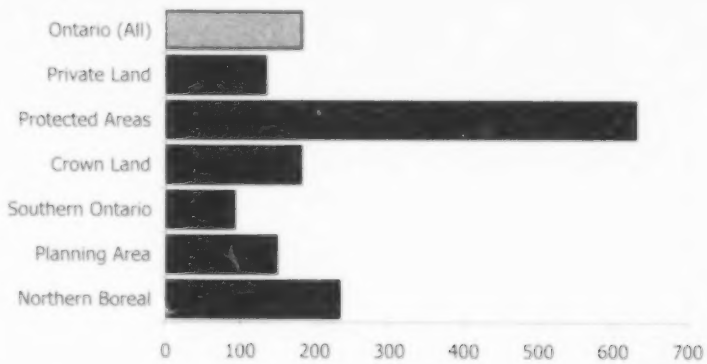


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (ha)

Site Region	Landscape Average	Standard Deviation
0E	1,494.8	3,073.2
1E	176.7	213.1
2E	203.0	110.9
2W	111.8	77.0
3E	129.6	59.5
3S	103.8	48.7
3W	207.9	426.4
4E	130.4	41.5
4S	134.7	68.3
4W	144.6	66.1
5E	130.1	87.9
5S	328.1	1,034.5
6E	84.0	145.5
7E	113.1	95.1

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region (ha)

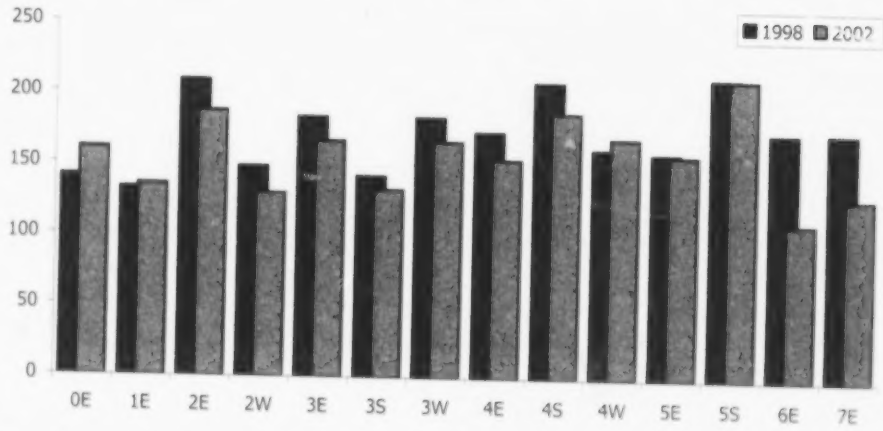
Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	233.6	417.2	127.7
Planning Area	149.2	2,665.3	50.2
Southern Ontario	92.6	152.3	4.8
Crown Land	181.8	429.4	126.7
Protected Areas	630.4	1,228.6	117.6
Private Land	134.5	2,203.9	44.4
Ontario (All)	183.1	1,434.6	76.8



Mean Patch Size for Ecoregionss (hectares)

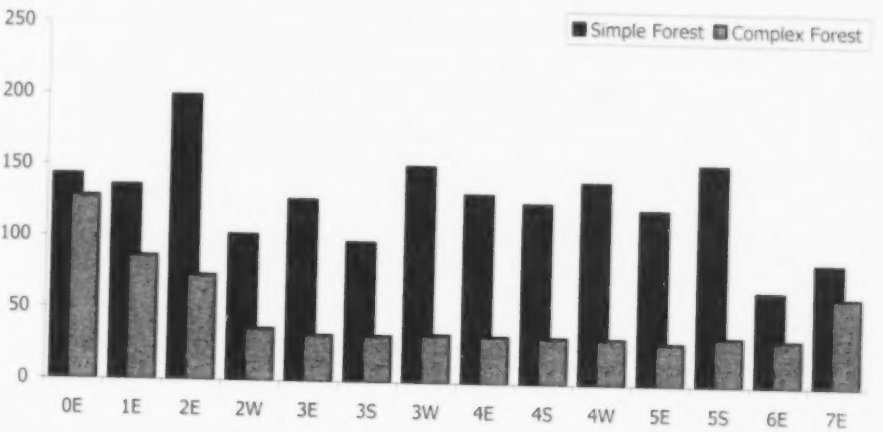
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics (ha)

Site Region	Landcover 1998	Landcover 2002
0E	141.1	160.9
1E	132.5	135.5
2E	209.0	187.5
2W	148.0	129.5
3E	183.4	166.7
3S	141.8	132.4
3W	183.4	166.7
4E	173.6	154.3
4S	209.0	187.5
4W	162.1	169.8
5E	159.3	158.0
5S	212.5	212.1
6E	174.2	110.8
7E	174.8	128.8



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics (ha)

Site Region	Simple Forest	Complex Forest
0E	143.1	128.3
1E	136.0	86.6
2E	199.2	73.6
2W	102.0	36.6
3E	127.0	32.5
3S	97.7	32.5
3W	151.4	33.6
4E	132.2	32.9
4S	126.3	32.8
4W	141.3	32.4
5E	122.4	29.8
5S	154.5	34.1
6E	65.9	32.6
7E	86.0	62.7



Simple Class Set - Forest Class Metrics (ha)

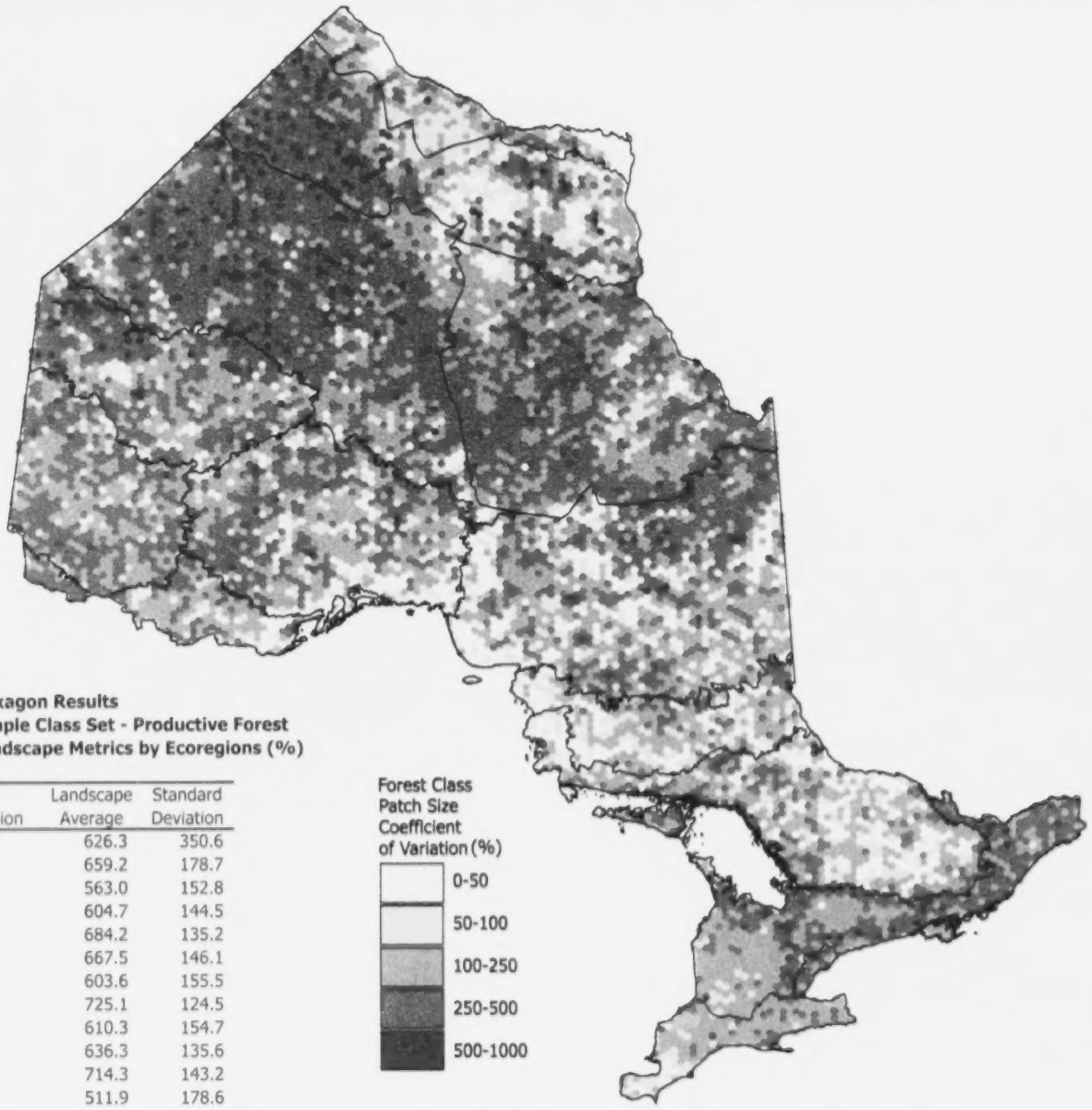
Site Region	Simple Forest	Simple Disturbed Forest
0E	12.7	38.6
1E	34.0	51.7
2E	66.6	87.6
2W	198.2	119.7
3E	1,251.6	40.1
3S	501.8	49.2
3W	1,052.7	52.4
4E	2,681.6	24.7
4S	771.4	30.4
4W	1,632.7	21.2
5E	1,923.1	17.2
5S	499.9	25.7
6E	51.6	5.0
7E	21.3	4.7

Hexagon Averages		
Forest	Protected Forest	Disturbed Forest
17.4	20.8	52.5
48.1	17.0	66.9
236.4	2,797.6	96.2
714.8	492.0	169.2
2,850.5	4,574.7	56.4
1,445.0	605.9	87.2
2,367.7	2,112.6	73.4
3,831.1	4,595.1	23.9
1,349.3	985.8	34.0
2,628.0	1,924.3	21.3
3,536.2	2,130.0	19.4
781.5	n/a	18.2
185.2	n/a	4.9
20.0	n/a	4.6

Complex Class Set - Forest Class Metrics (ha)

Complex Forest				
Hardwood Forest	Softwood Forest	Sparse Forest	Mixwood Forest	Disturbed Forest
19.6	31.3	9.3	23.2	38.6
9.5	13.9	24.0	10.9	51.7
17.3	37.6	12.8	14.1	87.9
9.9	36.8	29.1	13.6	119.7
18.4	50.3	13.3	50.6	40.1
10.5	67.6	26.2	15.1	49.2
22.5	43.3	18.9	35.9	52.4
31.3	29.7	8.8	85.6	24.7
8.8	22.3	28.6	39.2	30.4
18.6	21.2	24.3	64.0	21.2
40.4	18.6	14.5	52.7	17.2
21.3	21.3	33.4	19.7	25.7
15.5	11.5	8.4	15.9	5.0
16.8	6.3	11.3	7.3	4.7

Patch Size Coefficient of Variation (PSCOV)

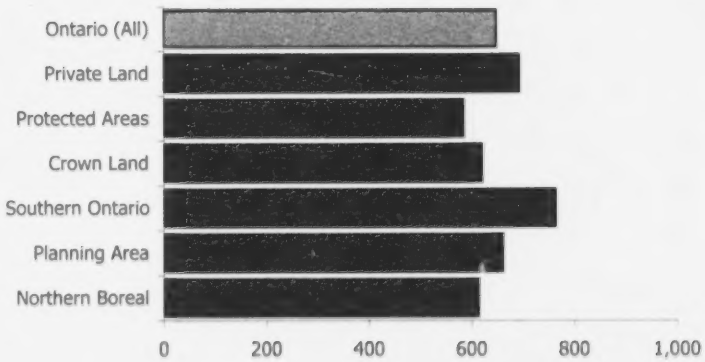


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (%)

Site Region	Landscape Average	Standard Deviation
0E	626.3	350.6
1E	659.2	178.7
2E	563.0	152.8
2W	604.7	144.5
3E	684.2	135.2
3S	667.5	146.1
3W	603.6	155.5
4E	725.1	124.5
4S	610.3	154.7
4W	636.3	135.6
5E	714.3	143.2
5S	511.9	178.6
6E	736.4	194.2
7E	806.2	184.1

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region (%)

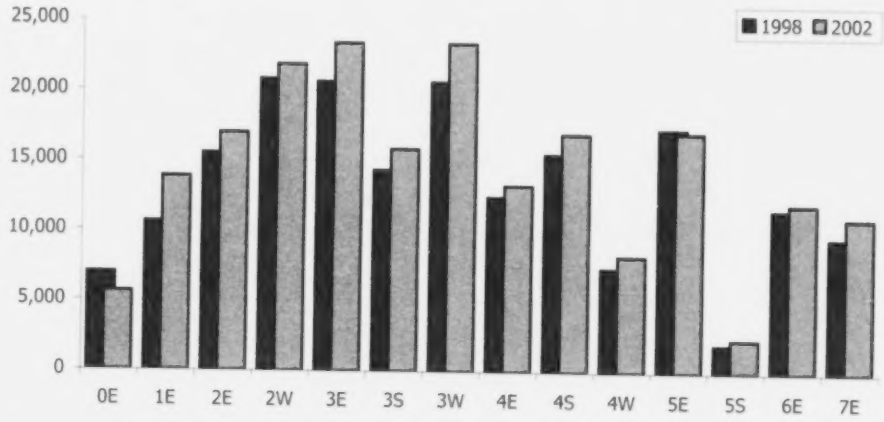
Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	613.3	287.2	186.0
Planning Area	660.2	200.0	149.2
Southern Ontario	763.0	243.9	38.8
Crown Land	619.5	292.8	183.5
Protected Areas	583.5	206.6	160.8
Private Land	692.3	209.5	142.8
Ontario (All)	647.3	243.3	156.5



Patch Size Coefficient of Variation (%)

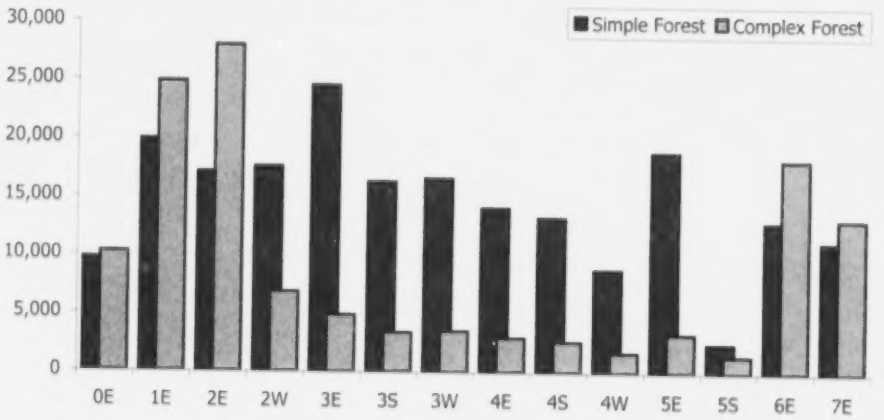
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics (%)

Site Region	Landcover 1998	Landcover 2002
0E	6,976.2	5,641.1
1E	10,614.8	13,859.1
2E	15,529.1	16,985.1
2W	20,805.6	21,850.7
3E	20,617.3	23,390.4
3S	14,343.1	15,837.7
3W	20,617.3	23,390.4
4E	12,475.4	13,290.4
4S	15,529.1	16,985.1
4W	7,409.3	8,287.9
5E	17,333.5	17,116.8
5S	2,002.4	2,377.8
6E	11,623.0	12,029.6
7E	9,619.9	11,038.4



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics (%)

Site Region	Simple Forest	Complex Forest
0E	9,706.0	10,251.3
1E	19,878.4	24,856.5
2E	17,090.1	27,952.2
2W	17,560.6	6,842.0
3E	24,527.0	4,881.3
3S	16,294.0	3,389.1
3W	16,588.3	3,517.6
4E	14,078.7	2,973.7
4S	13,268.4	2,644.6
4W	8,825.3	1,718.0
5E	18,898.4	3,322.2
5S	2,466.4	1,448.6
6E	12,903.6	18,250.0
7E	11,231.4	13,158.0

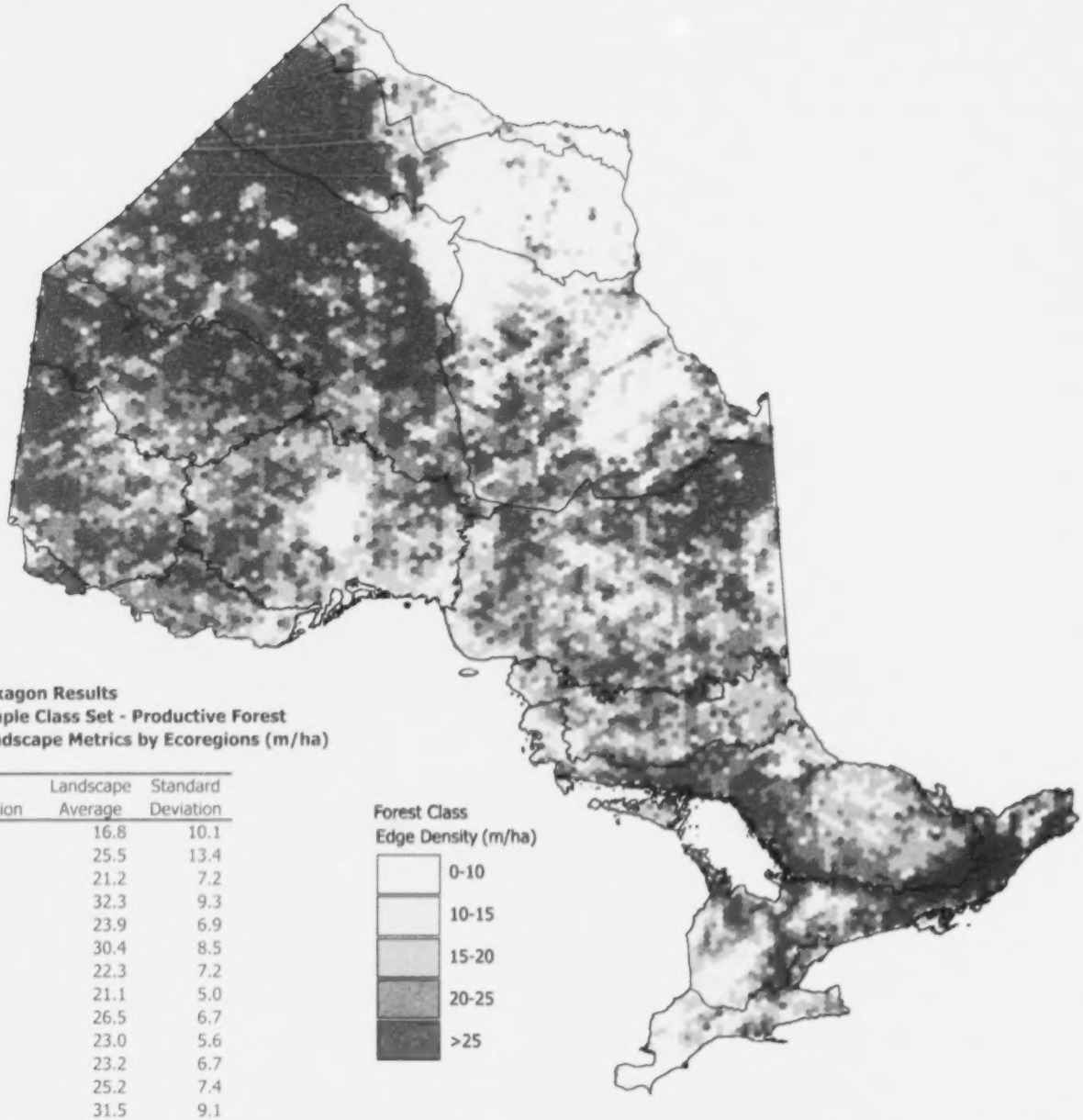


Simple Class Set - Forest Class Metrics (%)

Site Region	Simple Forest: Forest	Simple Forest: Disturbed Forest	Hexagon Averages: Forest	Hexagon Averages: Protected Forest	Hexagon Averages: Disturbed Forest
0E	641.6	769.1	165.0	151.9	158.3
1E	6,252.1	1,049.6	266.6	144.4	142.5
2E	7,362.0	457.5	268.4	167.3	119.1
2W	17,301.5	1,501.1	325.7	374.5	211.9
3E	8,984.6	902.4	202.4	165.0	176.3
3S	8,891.9	1,347.1	274.8	317.0	185.7
3W	7,479.2	712.1	209.9	219.2	162.6
4E	3,459.1	278.8	142.7	103.1	124.3
4S	6,622.9	467.8	250.1	293.7	142.1
4W	3,002.2	311.8	189.7	207.3	117.0
5E	5,411.5	415.3	158.2	206.1	77.0
5S	1,727.8	132.6	281.1	n/a	54.5
6E	2,716.8	48.6	271.5	n/a	42.1
7E	473.0	42.6	185.1	n/a	32.5

Complex Class Set - Forest Class Metrics (%)

Complex Forest: Hardwood Forest	Softwood Forest	Sparse Forest	Mixwood Forest	Disturbed Forest
241.4	384.7	330.2	330.6	769.1
202.4	533.5	2,666.9	340.2	1,049.4
607.9	2,313.0	412.0	923.2	456.7
343.8	3,414.2	3,949.2	649.5	1,501.7
1,050.0	4,228.3	1,213.4	5,822.3	902.4
305.6	3,833.4	2,876.5	1,047.4	1,347.1
766.9	3,568.1	1,061.3	2,178.5	712.1
2,626.4	1,913.1	347.8	2,599.9	278.9
193.7	1,110.4	1,611.3	2,763.6	467.4
626.2	929.1	1,239.1	1,920.4	311.8
3,664.1	1,342.8	1,088.6	3,271.2	415.3
294.5	393.0	613.6	398.8	132.6
503.3	713.4	408.5	689.6	48.6
323.9	279.9	444.8	204.8	42.6

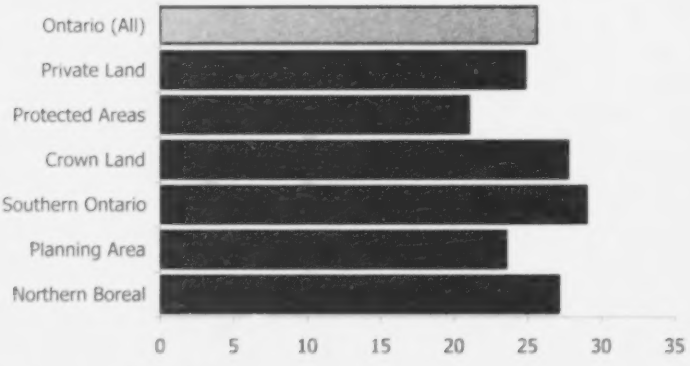


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (m/ha)

Site Region	Landscape Average	Standard Deviation
0E	16.8	10.1
1E	25.5	13.4
2E	21.2	7.2
2W	32.3	9.3
3E	23.9	6.9
3S	30.4	8.5
3W	22.3	7.2
4E	21.1	5.0
4S	26.5	6.7
4W	23.0	5.6
5E	23.2	6.7
5S	25.2	7.4
6E	31.5	9.1
7E	22.9	8.3

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region (m/ha)

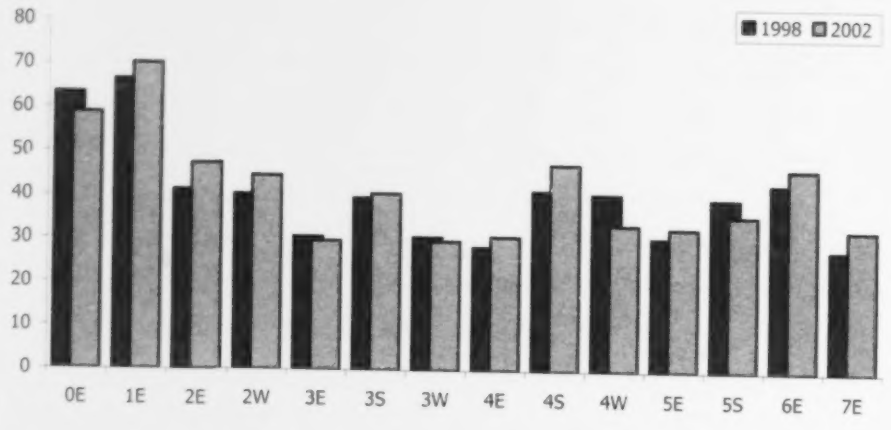
Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	27.1	21.9	9.7
Planning Area	23.5	21.5	6.7
Southern Ontario	29.0	19.5	4.6
Crown Land	27.7	22.5	9.6
Protected Areas	21.0	17.3	7.8
Private Land	24.8	21.3	7.0
Ontario (All)	25.6	21.5	7.7



Edge Density (metres edge per hectare)

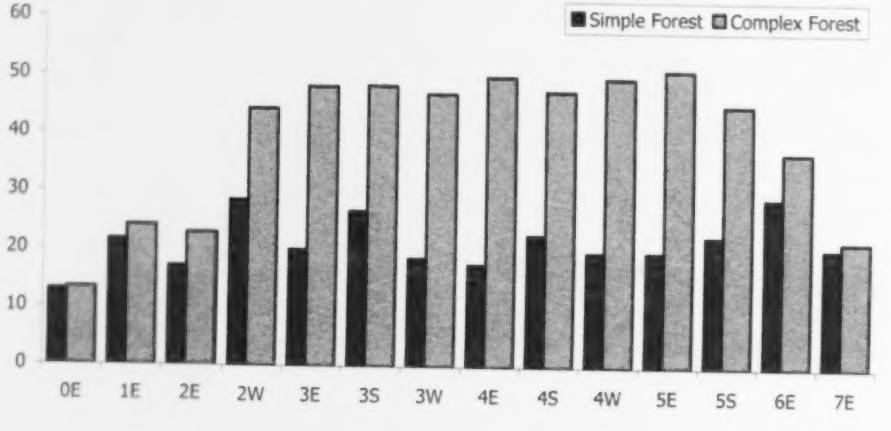
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics (m/ha)

Site Region	Landcover 1998	Landcover 2002
0E	63.5	58.9
1E	66.5	70.3
2E	41.3	47.4
2W	40.3	44.6
3E	30.6	29.7
3S	39.5	40.5
3W	30.6	29.7
4E	28.4	30.8
4S	41.3	47.4
4W	40.7	33.6
5E	30.7	32.9
5S	39.7	35.9
6E	43.1	46.6
7E	28.0	32.7



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics (m/ha)

Site Region	Simple Forest	Complex Forest
0E	12.9	13.3
1E	21.7	24.1
2E	17.1	22.9
2W	28.5	44.1
3E	20.0	48.0
3S	26.6	48.2
3W	18.6	46.8
4E	17.5	49.7
4S	22.6	47.3
4W	19.6	49.6
5E	19.7	51.0
5S	22.5	45.0
6E	29.0	36.9
7E	20.4	21.7

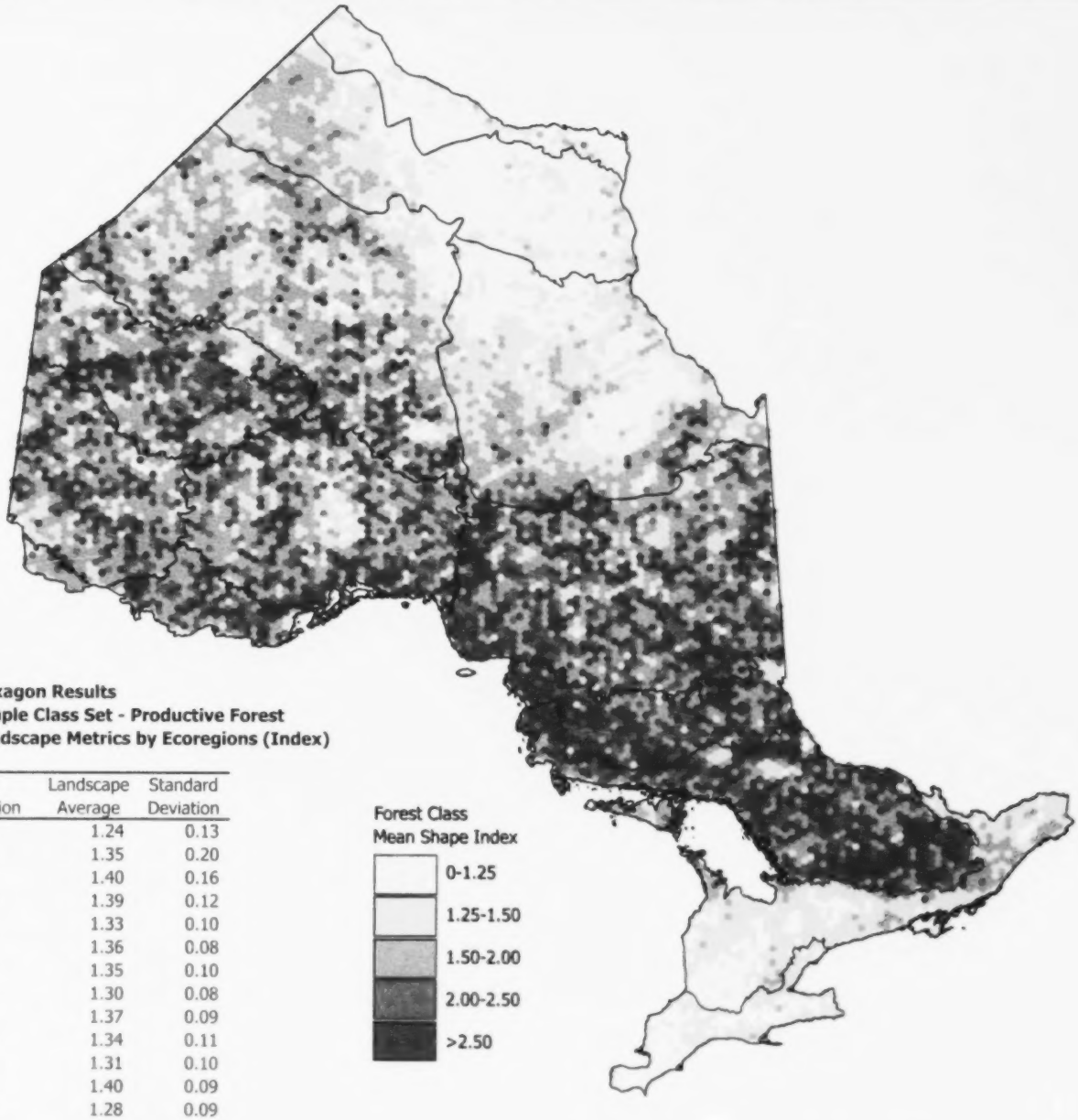


Simple Class Set - Forest Class Metrics (m/ha)

	Simple Forest		Hexagon Averages		
Site Region	Forest	Disturbed Forest	Forest	Protected Forest	Disturbed Forest
0E	10.5	2.1	12.1	9.1	7.1
1E	19.3	2.6	19.7	6.3	5.8
2E	16.2	0.9	16.9	24.6	4.4
2W	24.7	8.4	26.4	28.0	11.4
3E	19.0	7.0	21.9	18.5	8.4
3S	24.0	7.0	26.3	15.2	11.1
3W	17.5	5.8	20.1	20.7	7.2
4E	17.0	3.8	19.9	16.2	4.9
4S	21.5	5.5	23.9	30.3	7.0
4W	18.8	4.1	21.4	22.5	5.0
5E	19.0	0.7	21.6	25.3	2.0
5S	21.1	0.6	22.9	n/a	2.2
6E	21.6	2.6	21.5	n/a	5.3
7E	14.7	1.2	14.3	n/a	2.5

Complex Class Set - Forest Class Metrics (m/ha)

Complex Forest				
Hardwood Forest	Softwood Forest	Sparse Forest	Mixwood Forest	Disturbed Forest
0.1	1.2	9.1	0.9	2.1
0.1	2.9	18.3	3.0	2.6
0.5	11.8	10.6	4.8	0.9
1.7	18.5	24.3	11.5	8.4
8.6	23.8	14.6	28.1	7.0
2.5	24.9	26.3	13.4	7.0
10.0	20.7	18.5	24.8	5.8
16.0	20.4	8.8	36.2	3.7
3.1	16.1	27.0	24.7	5.5
12.7	12.9	21.9	31.1	4.1
19.5	14.5	15.0	32.6	0.7
16.5	9.0	25.0	15.7	0.6
11.3	6.6	5.0	14.5	2.6
10.1	1.5	3.6	2.2	1.2

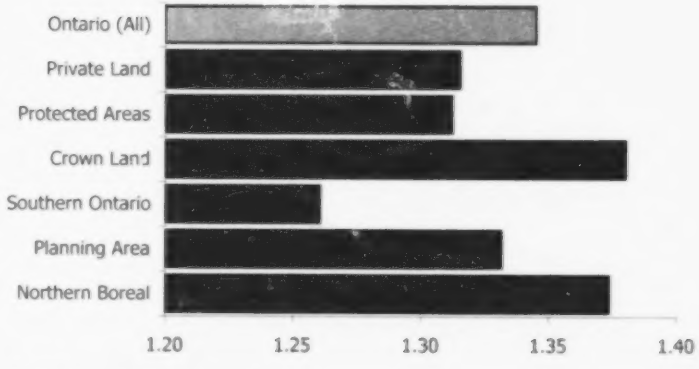


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (Index)

Site Region	Landscape Average	Standard Deviation
0E	1.24	0.13
1E	1.35	0.20
2E	1.40	0.16
2W	1.39	0.12
3E	1.33	0.10
3S	1.36	0.08
3W	1.35	0.10
4E	1.30	0.08
4S	1.37	0.09
4W	1.34	0.11
5E	1.31	0.10
5S	1.40	0.09
6E	1.28	0.09
7E	1.22	0.08

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region

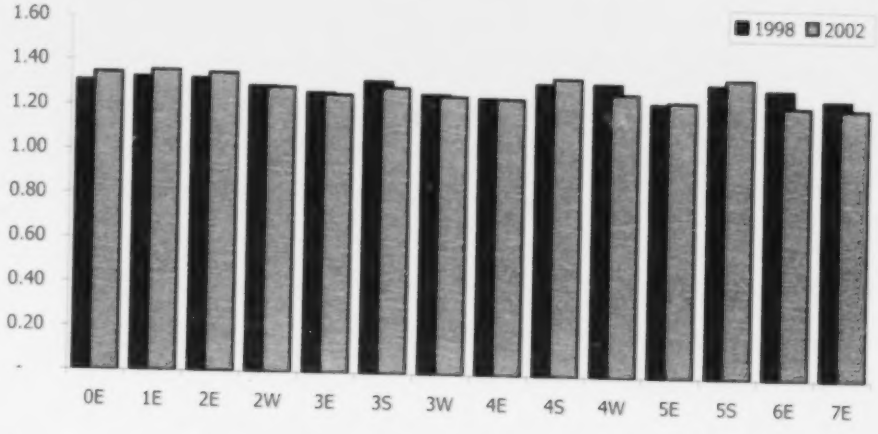
Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	1.37	1.63	1.58
Planning Area	1.33	2.48	1.35
Southern Ontario	1.26	1.39	1.04
Crown Land	1.38	1.64	1.58
Protected Areas	1.31	1.86	1.53
Private Land	1.32	2.28	1.31
Ontario (All)	1.34	2.00	1.41



Mean Shape Index for Ecoregions

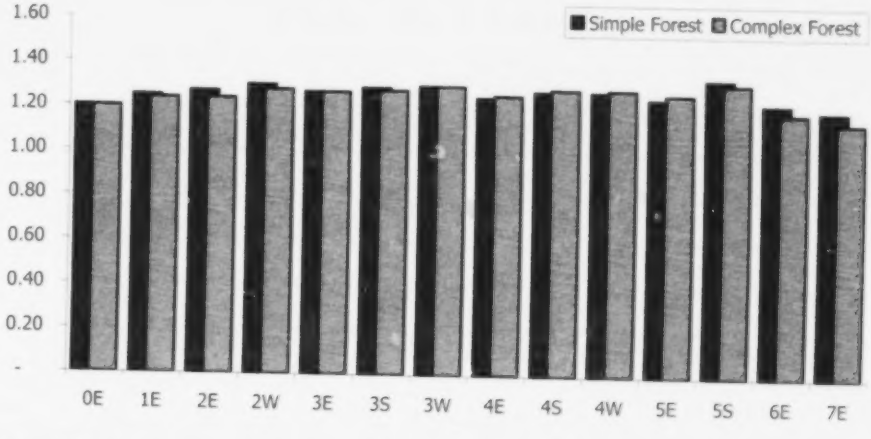
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics (Index)

Site Region	Landcover 1998	Landcover 2002
0E	1.31	1.35
1E	1.33	1.36
2E	1.32	1.35
2W	1.29	1.29
3E	1.27	1.26
3S	1.32	1.29
3W	1.27	1.26
4E	1.25	1.25
4S	1.32	1.35
4W	1.33	1.28
5E	1.24	1.25
5S	1.33	1.36
6E	1.31	1.23
7E	1.27	1.23



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics (Index)

Site Region	Simple Forest	Complex Forest
0E	1.20	1.20
1E	1.25	1.24
2E	1.27	1.24
2W	1.30	1.28
3E	1.27	1.27
3S	1.29	1.28
3W	1.30	1.30
4E	1.25	1.26
4S	1.28	1.29
4W	1.28	1.29
5E	1.25	1.27
5S	1.34	1.32
6E	1.23	1.19
7E	1.20	1.15



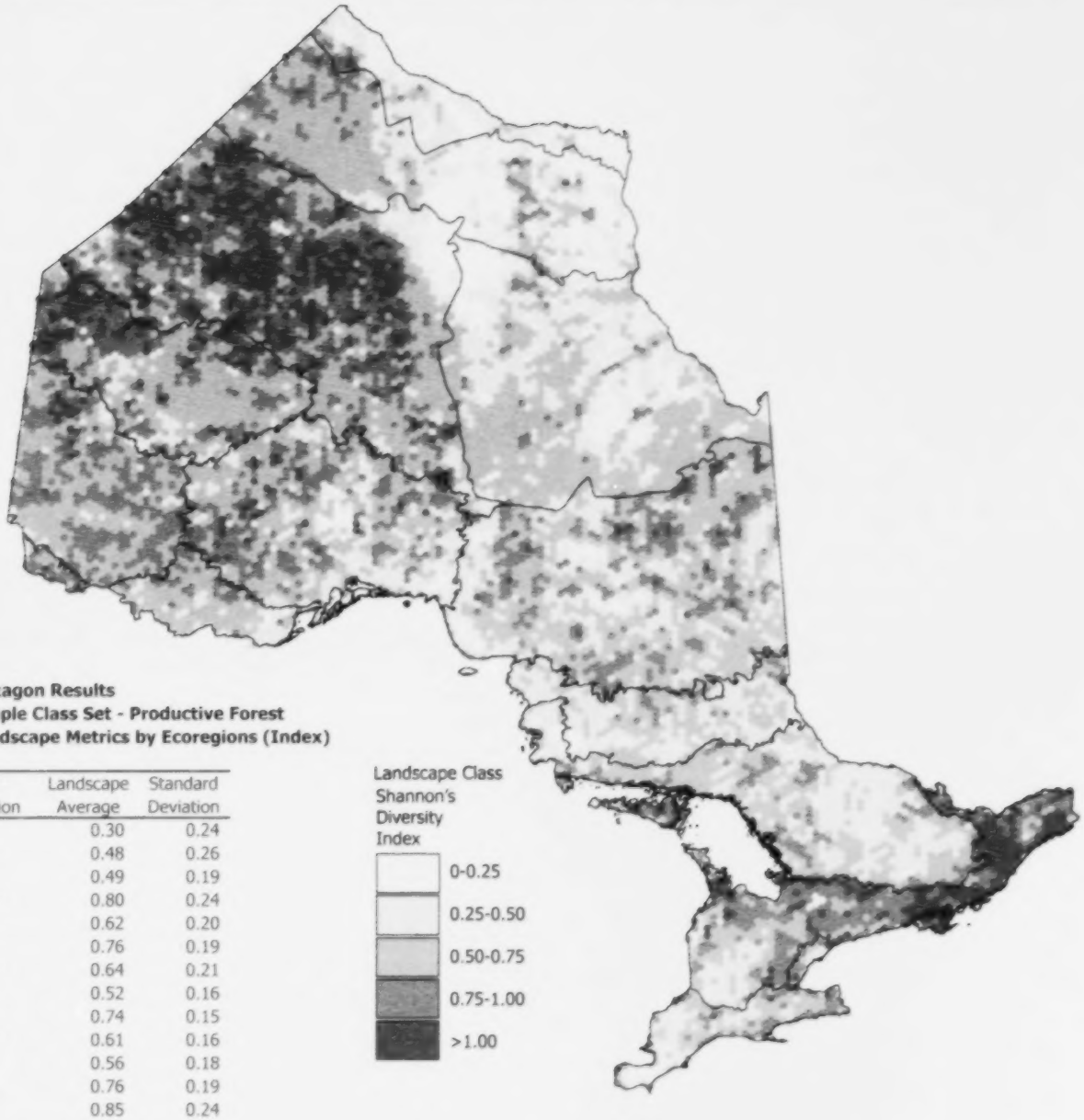
Simple Class Set - Forest Class Metrics (Index)

	Simple Forest	
Site Region	Forest	Disturbed Forest
0E	1.18	1.39
1E	1.24	1.37
2E	1.27	1.59
2W	1.27	1.41
3E	1.21	1.32
3S	1.25	1.35
3W	1.24	1.37
4E	1.27	1.30
4S	1.24	1.34
4W	1.25	1.26
5E	1.25	1.21
5S	1.34	1.39
6E	1.32	1.05
7E	1.26	1.04

Hexagon Averages		
Forest	Protected Forest	Disturbed Forest
1.21	1.21	1.49
1.31	1.19	1.48
1.47	3.33	1.69
1.85	1.71	1.60
2.48	2.62	1.36
2.29	1.70	1.48
2.29	2.36	1.41
2.83	2.76	1.27
2.19	2.24	1.34
2.48	2.42	1.25
2.91	2.51	1.22
1.85	n/a	1.26
1.43	n/a	1.05
1.24	n/a	1.03

Complex Class Set - Forest Class Metrics (Index)

Complex Forest				
Hardwood Forest	Softwood Forest	Sparse Forest	Mixwood Forest	Disturbed Forest
1.28	1.36	1.16	1.30	1.39
1.15	1.19	1.26	1.18	1.37
1.19	1.33	1.21	1.19	1.59
1.14	1.28	1.32	1.21	1.41
1.24	1.31	1.20	1.33	1.32
1.17	1.34	1.29	1.22	1.35
1.27	1.32	1.26	1.35	1.37
1.27	1.28	1.14	1.43	1.30
1.14	1.26	1.33	1.33	1.34
1.25	1.24	1.29	1.41	1.26
1.30	1.22	1.20	1.41	1.21
1.31	1.23	1.40	1.28	1.39
1.21	1.16	1.12	1.24	1.05
1.23	1.06	1.15	1.10	1.04

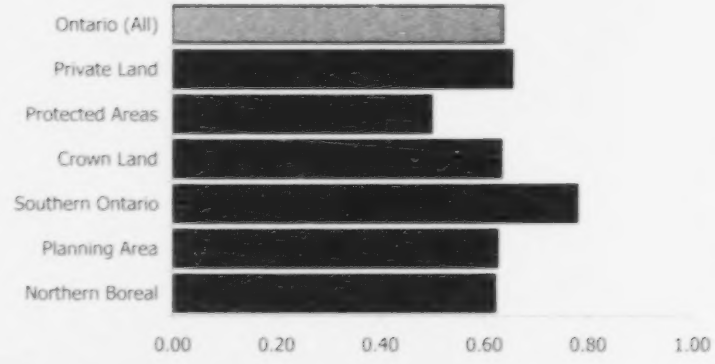


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (Index)

Site Region	Landscape Average	Standard Deviation
0E	0.30	0.24
1E	0.48	0.26
2E	0.49	0.19
2W	0.80	0.24
3E	0.62	0.20
3S	0.76	0.19
3W	0.64	0.21
4E	0.52	0.16
4S	0.74	0.15
4W	0.61	0.16
5E	0.56	0.18
5S	0.76	0.19
6E	0.85	0.24
7E	0.62	0.23

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region

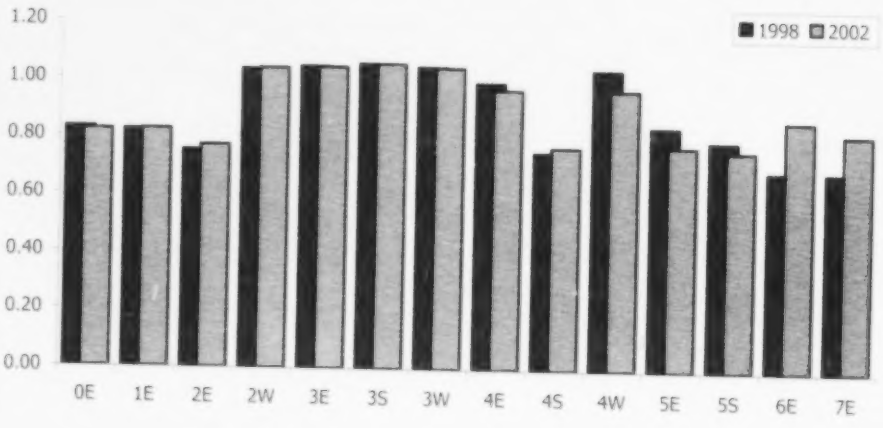
Planning Zone or Ownership	Landscape
Northern Boreal	0.62
Planning Area	0.63
Southern Ontario	0.78
Crown Land	0.63
Protected Areas	0.50
Private Land	0.65
Ontario (All)	0.64



Shannon's Diversity Index

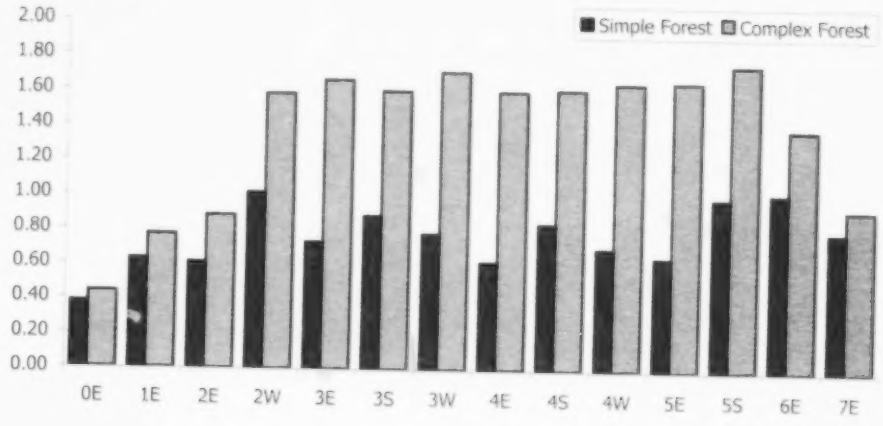
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics (Index)

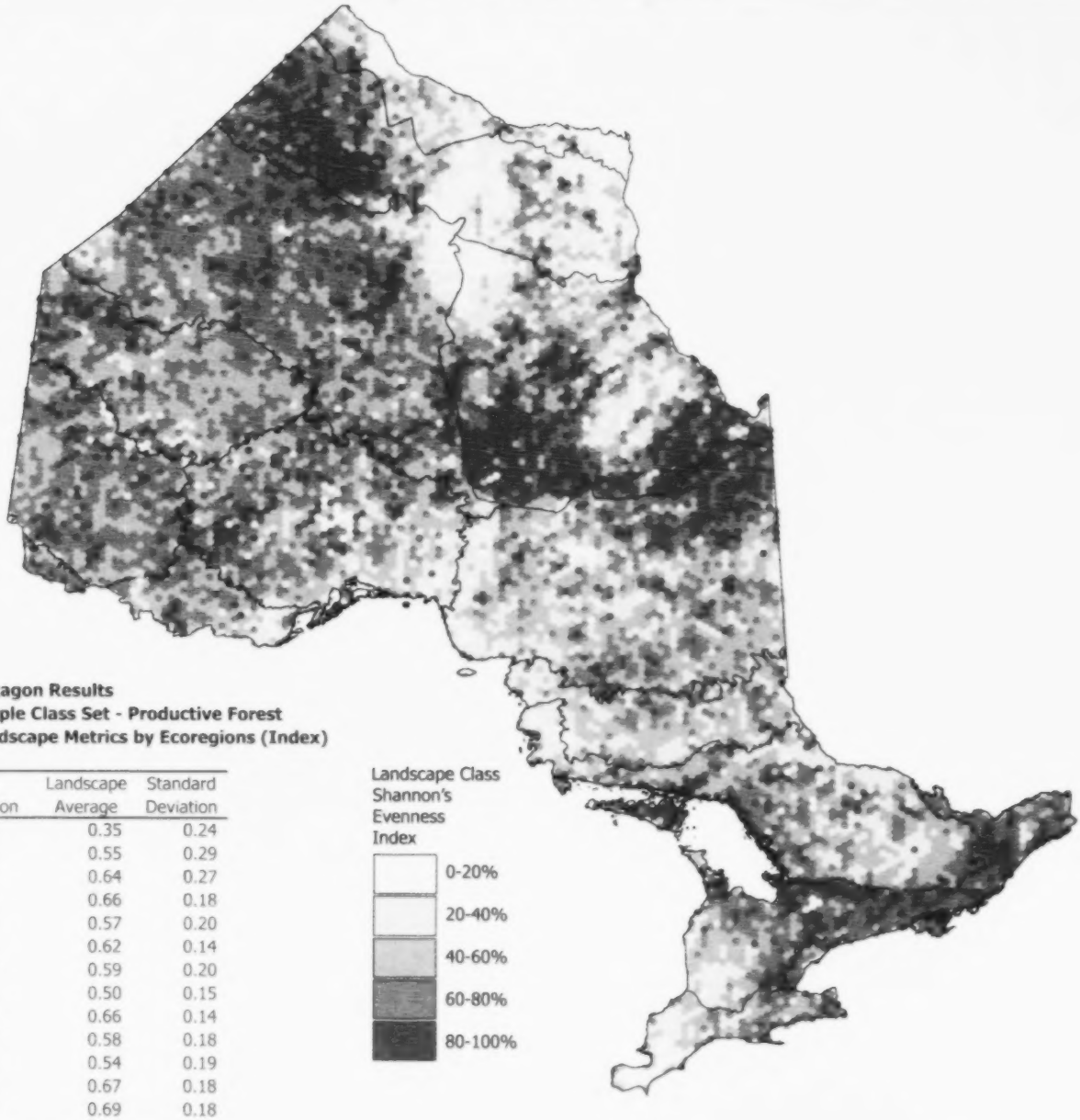
Site Region	Landcover 1998	Landcover 2002
0E	0.83	0.82
1E	0.82	0.83
2E	0.75	0.77
2W	1.04	1.04
3E	1.05	1.04
3S	1.06	1.06
3W	1.05	1.04
4E	0.99	0.97
4S	0.75	0.77
4W	1.04	0.97
5E	0.84	0.78
5S	0.80	0.76
6E	0.69	0.87
7E	0.69	0.83



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics (Index)

Site Region	Simple Forest	Complex Forest
0E	0.38	0.44
1E	0.63	0.77
2E	0.61	0.88
2W	1.01	1.58
3E	0.73	1.66
3S	0.88	1.60
3W	0.78	1.71
4E	0.62	1.60
4S	0.84	1.61
4W	0.70	1.65
5E	0.65	1.66
5S	0.99	1.76
6E	1.02	1.39
7E	0.80	0.93



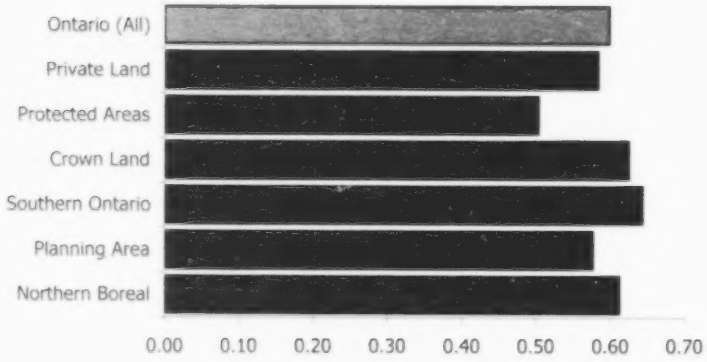


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (Index)

Site Region	Landscape Average	Standard Deviation
0E	0.35	0.24
1E	0.55	0.29
2E	0.64	0.27
2W	0.66	0.18
3E	0.57	0.20
3S	0.62	0.14
3W	0.59	0.20
4E	0.50	0.15
4S	0.66	0.14
4W	0.58	0.18
5E	0.54	0.19
5S	0.67	0.18
6E	0.69	0.18
7E	0.52	0.22

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region

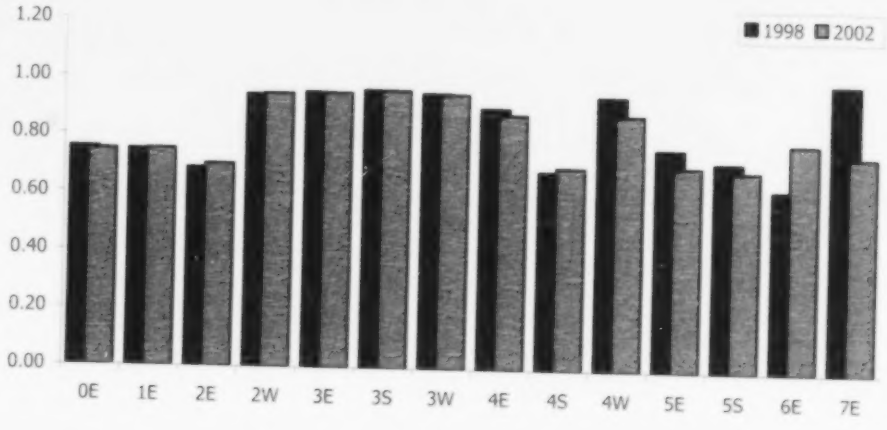
Planning Zone or Ownership	Landscape
Northern Boreal	0.61
Planning Area	0.58
Southern Ontario	0.64
Crown Land	0.63
Protected Areas	0.50
Private Land	0.58
Ontario (All)	0.60



Shannon's Evenness Index

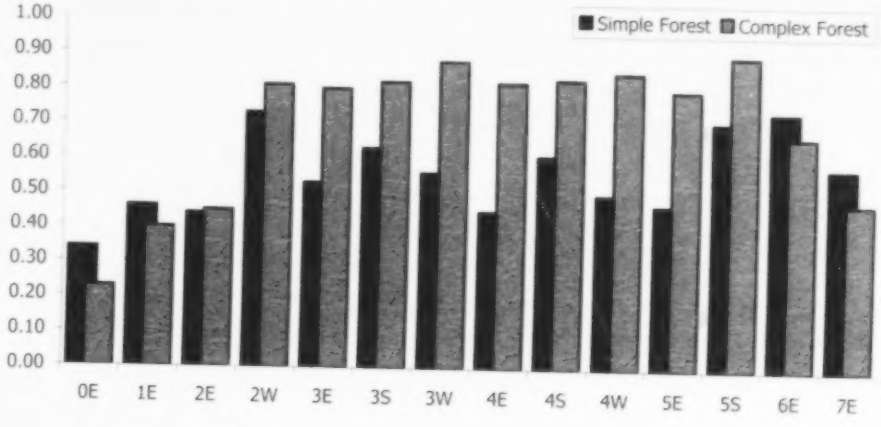
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics

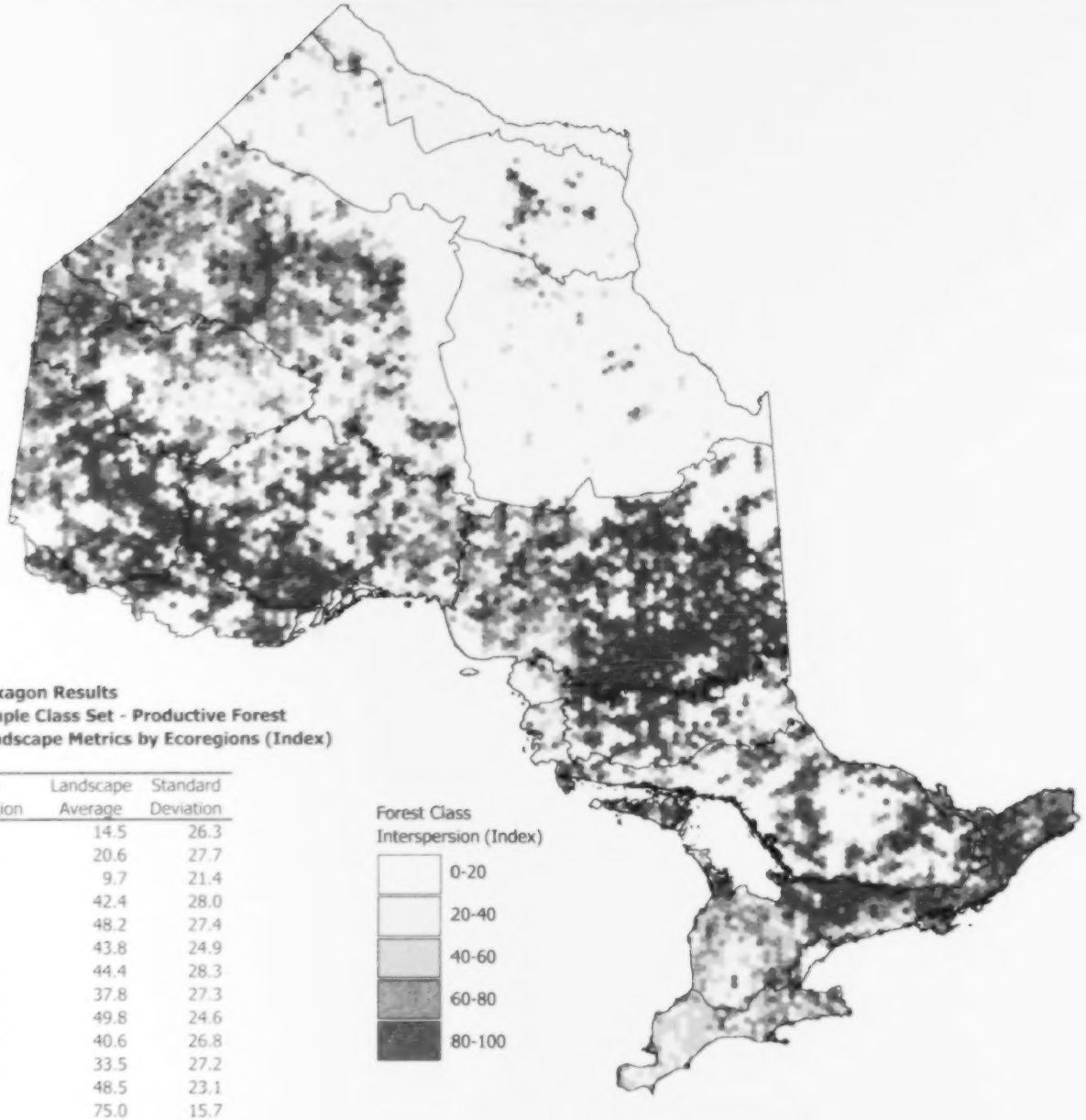
Site Region	Landcover 1998	Landcover 2002
0E	0.76	0.75
1E	0.75	0.75
2E	0.69	0.70
2W	0.94	0.95
3E	0.95	0.95
3S	0.96	0.96
3W	0.95	0.95
4E	0.90	0.88
4S	0.69	0.70
4W	0.95	0.88
5E	0.77	0.71
5S	0.72	0.70
6E	0.63	0.79
7E	1.00	0.75



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics

Site Region	Simple Forest	Complex Forest
0E	0.34	0.23
1E	0.46	0.40
2E	0.44	0.45
2W	0.73	0.81
3E	0.53	0.80
3S	0.63	0.82
3W	0.56	0.88
4E	0.45	0.82
4S	0.61	0.83
4W	0.50	0.85
5E	0.47	0.80
5S	0.71	0.90
6E	0.74	0.67
7E	0.58	0.48



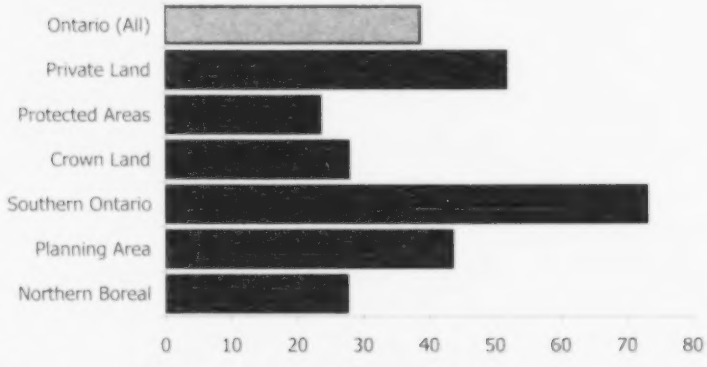


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (Index)

Site Region	Landscape Average	Standard Deviation
0E	14.5	26.3
1E	20.6	27.7
2E	9.7	21.4
2W	42.4	28.0
3E	48.2	27.4
3S	43.8	24.9
3W	44.4	28.3
4E	37.8	27.3
4S	49.8	24.6
4W	40.6	26.8
5E	33.5	27.2
5S	48.5	23.1
6E	75.0	15.7
7E	68.9	17.7

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region

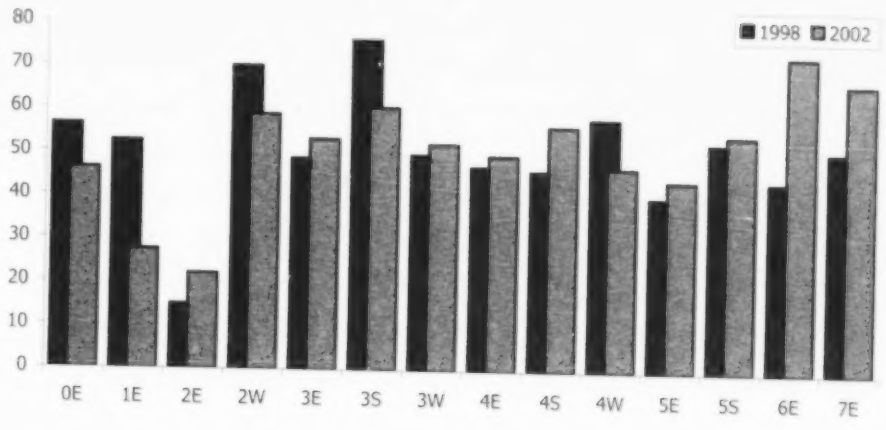
Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	27.6	25.4	57.6
Planning Area	43.6	56.4	40.1
Southern Ontario	73.0	63.7	74.5
Crown Land	27.9	25.6	58.0
Protected Areas	23.5	24.0	49.9
Private Land	51.7	60.8	44.2
Ontario (All)	38.7	42.9	48.7



Interspersion Juxtaposition Index

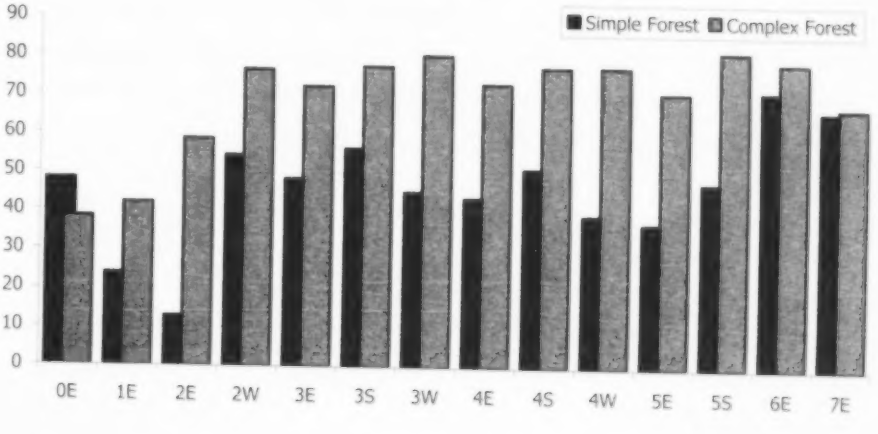
Simple Class Set - All Forest - Landcover 1998 vs. 2002 - Landscape Level Metrics

Site Region	Landcover 1998	Landcover 2002
0E	56.3	46.3
1E	52.6	27.5
2E	14.9	22.0
2W	70.0	58.9
3E	48.7	53.2
3S	76.2	60.6
3W	49.8	52.2
4E	47.1	49.6
4S	46.2	56.5
4W	58.3	47.1
5E	40.2	44.1
5S	52.8	54.7
6E	44.1	73.2
7E	51.2	67.0



Simple Class Set - Productive Forest vs. Complex Class Set - Landscape Level Metrics

Site Region	Simple Forest	Complex Forest
0E	48.2	38.4
1E	23.9	42.1
2E	12.8	58.7
2W	54.5	76.7
3E	48.4	72.3
3S	56.3	77.7
3W	45.2	80.6
4E	43.7	73.2
4S	51.3	77.6
4W	39.4	77.8
5E	37.4	71.2
5S	47.9	82.0
6E	71.8	79.2
7E	66.8	67.7



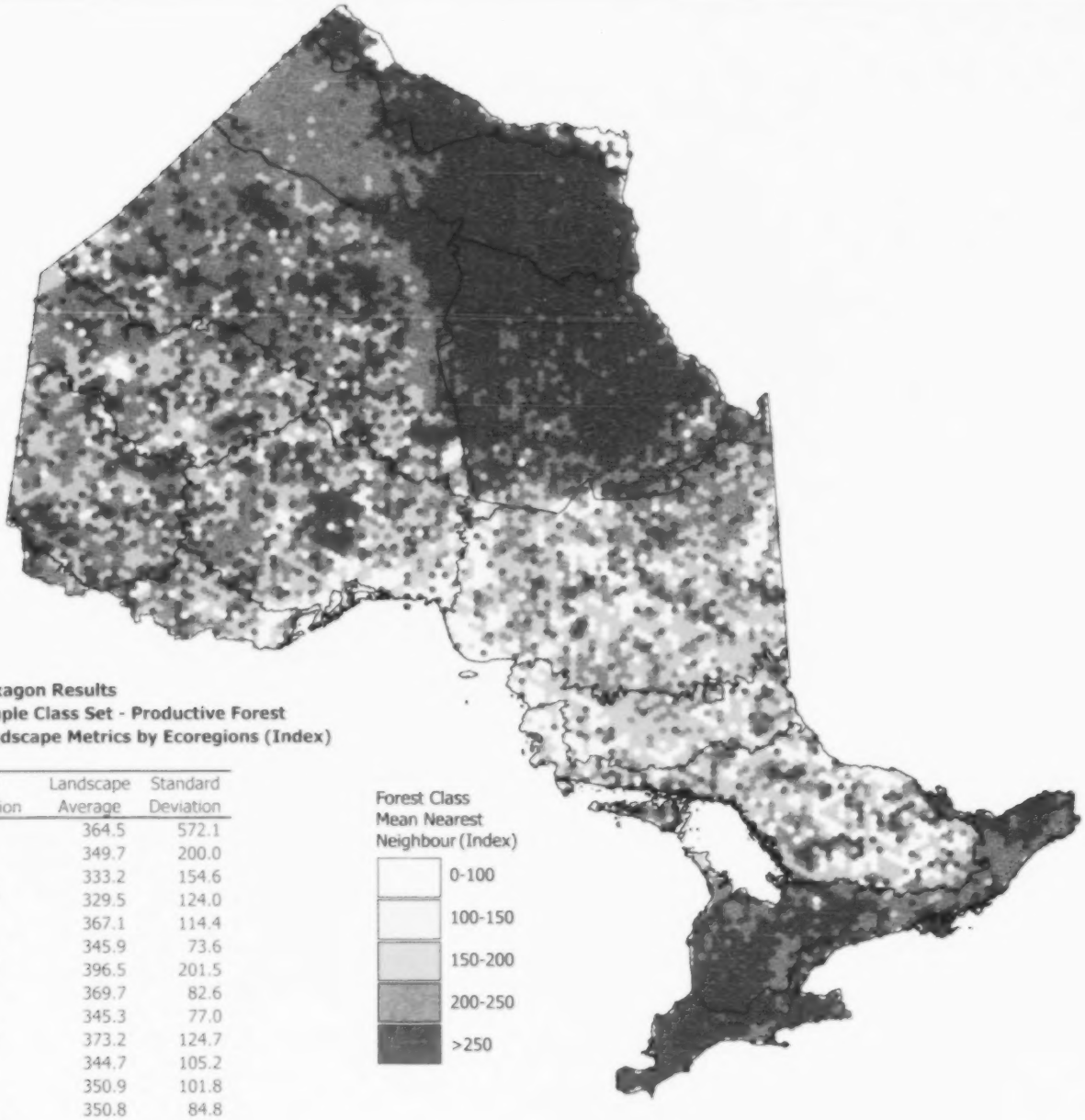
Simple Class Set - Forest Class Metrics

	Simple Forest	
Site Region	Forest	Disturbed Forest
0E	18.8	58.9
1E	10.2	42.3
2E	4.6	40.0
2W	57.5	63.2
3E	64.1	32.6
3S	65.0	58.1
3W	58.2	39.1
4E	62.7	24.5
4S	67.4	35.9
4W	55.0	28.7
5E	51.9	30.1
5S	68.9	28.1
6E	68.9	85.3
7E	61.4	71.6

Hexagon Averages		
Forest	Protected Forest	Disturbed Forest
8.4	2.1	47.9
10.9	10.8	51.2
5.0	24.8	50.9
44.8	63.4	62.3
62.3	17.8	39.3
50.9	8.3	52.2
56.1	30.7	44.3
51.6	13.5	31.9
64.4	68.9	41.6
54.6	18.1	37.0
44.9	5.4	29.0
67.9	n/a	25.4
68.6	n/a	79.4
53.0	n/a	64.3

Complex Class Set - Forest Class Metrics

Complex Forest				
Hardwood Forest	Softwood Forest	Sparse Forest	Mixwood Forest	Disturbed Forest
32.8	42.7	17.5	26.5	25.8
68.4	58.3	29.4	60.8	34.3
70.0	56.2	48.2	62.5	35.1
86.1	73.5	76.9	82.1	73.7
61.2	67.7	77.3	76.6	77.3
90.6	71.8	80.7	78.9	74.2
69.3	77.1	84.5	83.2	83.8
58.1	62.5	79.8	80.9	81.6
78.3	73.1	80.5	79.2	78.9
66.6	71.4	81.4	82.9	78.3
61.5	65.0	76.8	76.0	79.0
79.3	82.5	86.1	83.8	76.6
74.0	81.8	82.3	78.2	73.0
49.3	71.1	51.1	64.6	59.4

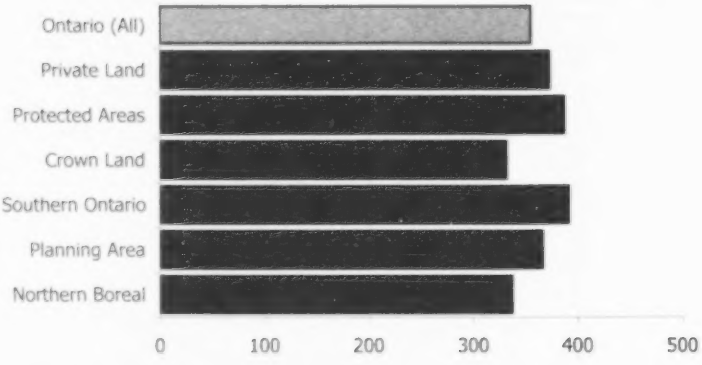


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (Index)

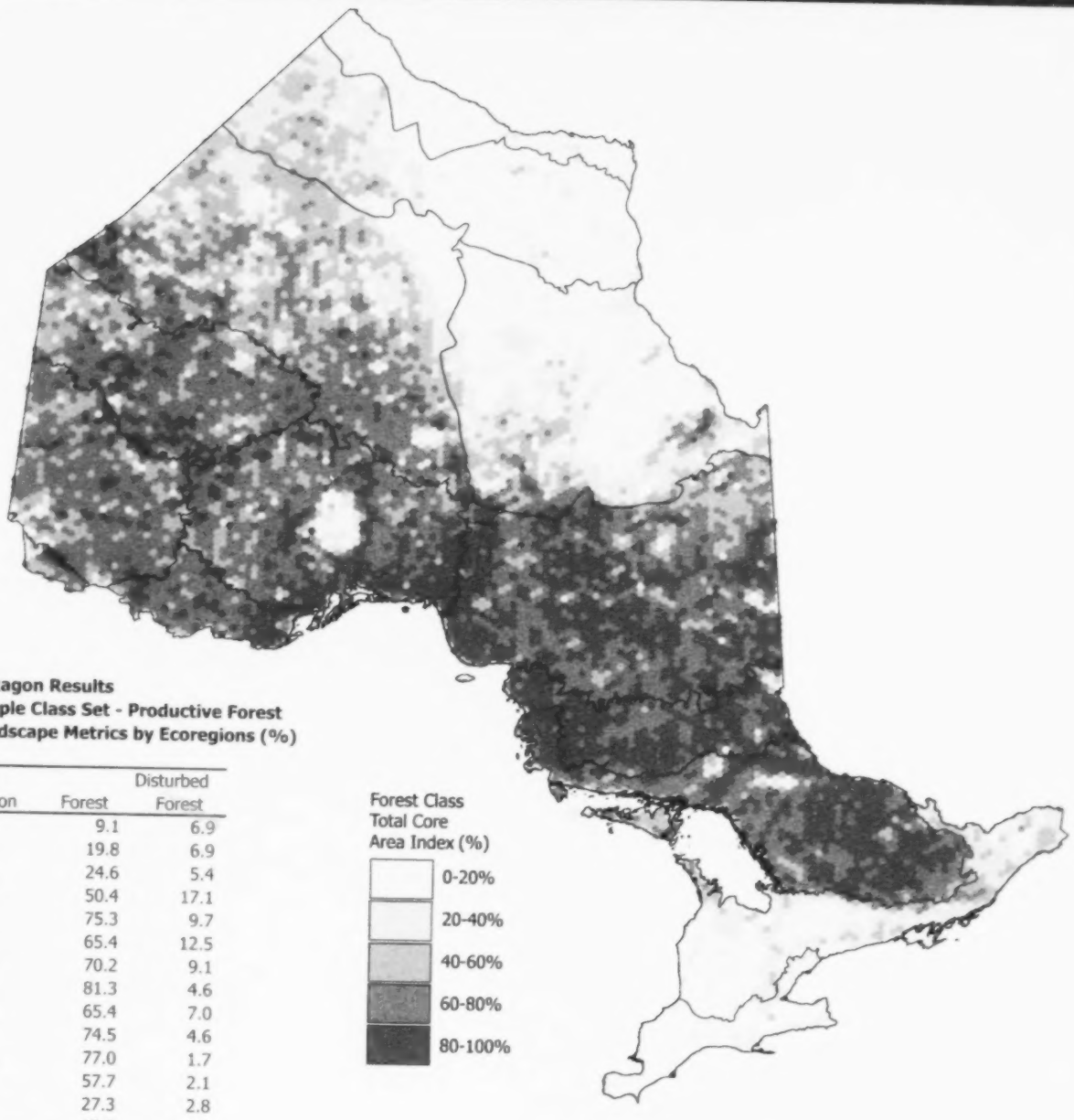
Site Region	Landscape Average	Standard Deviation
0E	364.5	572.1
1E	349.7	200.0
2E	333.2	154.6
2W	329.5	124.0
3E	367.1	114.4
3S	345.9	73.6
3W	396.5	201.5
4E	369.7	82.6
4S	345.3	77.0
4W	373.2	124.7
5E	344.7	105.2
5S	350.9	101.8
6E	350.8	84.8
7E	499.6	295.1

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region

Planning Zone or Ownership	Landscape	Forest	Disturbed Forest
Northern Boreal	337.3	308.1	404.5
Planning Area	366.4	209.7	497.4
Southern Ontario	391.5	311.1	666.7
Crown Land	331.7	299.5	404.5
Protected Areas	387.2	350.7	404.5
Private Land	372.8	225.0	493.4
Ontario (All)	355.2	262.8	472.4



Total Core Area Index (TCAI)

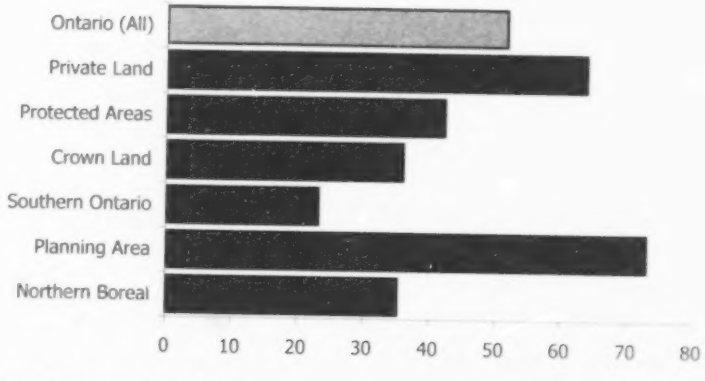


Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Ecoregions (%)

Site Region	Forest	Disturbed Forest
0E	9.1	6.9
1E	19.8	6.9
2E	24.6	5.4
2W	50.4	17.1
3E	75.3	9.7
3S	65.4	12.5
3W	70.2	9.1
4E	81.3	4.6
4S	65.4	7.0
4W	74.5	4.6
5E	77.0	1.7
5S	57.7	2.1
6E	27.3	2.8
7E	12.8	1.3

Hexagon Results
Simple Class Set - Productive Forest
Landscape Metrics by Administrative Region (%)

Planning Zone or Ownership	Forest	Disturbed Forest
Northern Boreal Planning Area	35.3	13.2
Southern Ontario	73.0	7.6
Crown Land	23.2	2.4
Protected Areas	36.0	12.9
Private Land	42.3	11.2
Ontario (All)	63.9	7.5
	51.7	9.4



8 – Source Data

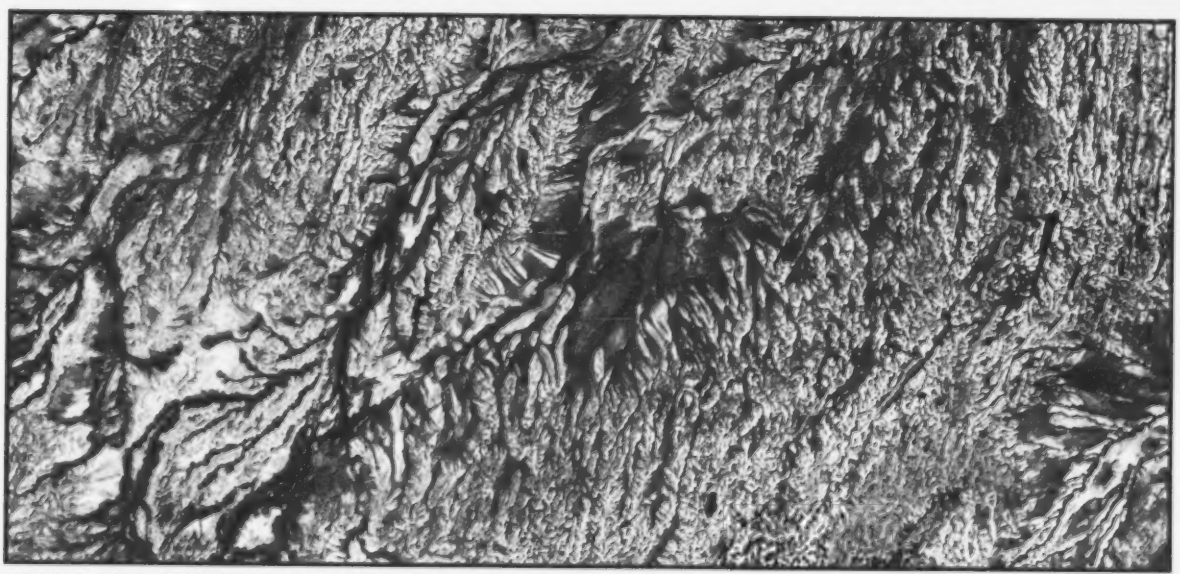
To better understand the information used in this publication, a complete listing of the various data sources, with examples, is provided. As well as data sources, changes and anomalies from previous versions of the report are also detailed to simplify comparisons between reports.

8.1 - Ontario's Total Area

Before 2001, the Forest Resource series reported Ontario's total area as 106.8 million hectares. In 2001, that area was revised to 107.6 million hectares. Ontario did not increase in size, but rather, the way we measure it has changed. Improvements in mapping technology and geographic information systems continue to refine the actual measurements we derive from our landbase.

For the purposes of this report, Ontario's total area is 107,554,153 hectares, which is reduced by 32.5 thousand hectares from the 2001 total of 107,591,680 hectares. This may sound like a large difference in area, but it actually translates to 0.034% of the provincial area. The changes result from increased precision in the provincial boundaries, especially in the west and northern portions of the province.

The initial area of 106.8 million hectares was compiled in 1958, using paper maps and hand tallies of area. To have measured area in this fashion, without the benefit of geographic information systems and computers, and come to within 0.71% of our current area, is quite an impressive feat.



Landsat 7 Raw Satellite Image - Albany River - Hudson Bay Lowlands

8.2 – Digital Inventory Data

Although forest resources inventories (FRI) have been available in digital format for over 15 years, the ability to store and effectively analyze them in GIS format for the entire province has been limited. With improvements to GIS software, and the steady increase in computer processing available, a fully digital provincial GIS coverage has finally become a reality.

Chapter 3 describes in detail where digital FRI exists for the province. The inventories available have been submitted as part of the Forest Management Planning (FMP) system, and most follow the new inventory standard as defined in the Forest Information Manual (FIM). The technical specification and details of the Forest Information Manual, as well as the Forest Management Planning Manual, are available online at www.mnr.gov.on.ca.

Section 8.5 details several example stands from an existing forest resources inventory, and compares other source of information to the same area.

8.3 – Satellite Data

Over the next few years, as more inventories become available and digital coverage increases, the actual area summarized by the Forest Resources of Ontario will increase as well. Currently there are projects under way to digitize large parks and forest areas north of the AOU.

Chapter 3 also identifies that satellite summaries in this document are based on Landsat 7 imagery, rather than the Landsat 5 imagery in the Forest Resources of Ontario 2001. The Landsat 7 satellite was launched in April 1999, and represents a significant increase in image acquisition technology over the Landsat 5 satellite, which was launched in March 1984.

The imagery used in the 2001 version of this report was developed from a mosaic of scenes acquired between 1990 and 1995, with depletion updates for 1996 and 1997. The sensors aboard Landsat 5 could identify four spectral bands at a ground sample area (pixel) of roughly 60 by 80 metres.

Landsat 7 has enhanced sensors, which record eight spectral bands, and has a ground sample area of 30 x 30 metres. The imagery used in this report was developed from a mosaic of scenes acquired from 2000 to 2002. Since only the AOU and Northern Boreal were completed for this version, Landsat 5 data was incorporated in the southwestern and eastern portions of Southern Ontario. The central portion of Southern Ontario (roughly from Midland south to St. Thomas, across to Bellville), was updated using other remote sensing data available from the MNR. The Southern Ontario Land Resource Information System (SOLRIS) is a project that also utilizes remote sensing data, and although the data classes are not identical, they were close enough to be used at a broad classification scale.

There are two main issues around comparing landcover details between the two vintages of satellite imagery. The first is the difference in technology. Increased resolution, coupled with better detection of actual forest cover, yielded a slight increase in forest area. Some areas in the Hudson Bay Lowlands had a significant increase in sparse deciduous in very small linear patterns where no forest had been detected previously.

The other landcover comparison issue is the manner in which the Landsat 5 data was fitted to the landscape. The GIS methodology used in the past resulted in some stretching and distortion that rendered a "shift" or misalignment of small landscape features across the province. This will yield slightly different class values when draped across other GIS layers used in this report.

Citation for the Provincial Land Cover 2000:
"Spectranalysis Inc. 2004. Introduction to the Ontario Land Cover Data Base, Second Edition (2000): Outline of Production Methodology and Description of 27 Land Cover Classes. Report to Ontario Ministry of Natural Resources. Unpublished"

Landsat and other remote sensing imagery information are available online at:

- USGS – landsat7.usgs.gov/index.php
- Canada Centre for Remote Sensing - www.ccrs.nrcan.gc.ca

8.4 – Comparing Satellite and FRI

The forest resources inventory (FRI) employs a process that delineates forest stands for use within the forest management planning (FMP) process. Forest stands are generally only delineated to a minimum size, which until recently was 4 hectares, and is now 2 hectares or about 5 acres. Although smaller stands do occur after the FRI is refined, and other map information is incorporated, they will not reflect the same types of forest that satellite imagery recognizes.

Satellite imagery defines forest based on pixels on a photograph, so a long line of single trees on a fence line, or even a very small group of trees can be picked up and classed as forest.

The difference between these two systems is generally not a concern within the forest dominated Area of the Undertaking

(AOU). In Southern Ontario however, can be an issue when readers think that both systems should yield the same area of forest.

According to the 2002 satellite imagery used in this report, Southern Ontario (not including Manitoulin Island), contains approximately 2,023,518 hectares of forest. This includes all groups of trees well below one hectare in area. If the minimum size criteria for forest is increased to 1 hectare, and excludes linear groups of trees, the total area of forest drops to 928,180 hectares. Figure 8.4.1 shows the relationship between minimum forest size class and area of forest for Southern Ontario. The average patch size of forest for Southern Ontario is approximately 1/20th the size of that in the AOU (see Chapter 7).

Figure 8.4.1

Minimum Forest Size Class	Area
25 metre (satellite)	2,023,518
1 hectare	928,180
4 hectares	583,192
10 hectares	338,690
25 hectares	178,250
50 hectares	103,100
100 hectares	55,500

8.5 – Geographic Projections

Due to curvature of the Earth, any paper or flat map distorts the Earth's surface to some extent. The larger the area represented by a map, the greater the distortion can be. Ontario covers a very large area, and is over 1,500 kilometres north to south and east to west. A map projection is a way to portray geographic data on a flat surface. There are many different types of projections commonly used today, and each has its own advantages and disadvantages.

Information used in this report comes from several different map projections. Most of Ontario's digital FRI data is developed in the Universal Transverse Mercator Projection (UTM). The UTM system divides Ontario in to four zones (15-18), and is generally a very accurate and reliable system within each zone.

Since Ontario crosses four UTM zones, provincial level mapping needs to use a slightly different projection to view its full extent. The second most common projection used by the MNR is Lambert Conformal Conic, which is commonly used by other jurisdictions in North America. This projection represents direction and area very well, and shapes of geographic areas remain true. All of the data used in this report has been moved to the Lambert Conformal Conic Projection for consistency and ease of use.

The actual details of the projection are:

- Canada_Lambert_Conformal_Conic, GCS North American 1983, Datum – North American 1983 (NAD83), Spheroid - GRS 1980, False Easting 930,000, False Northing 6,430,000, Central Meridian 85.0, Standard Parallel 1 - 44.5, Standard Parallel 2 - 53.5, Latitude Of Origin, 0.0.

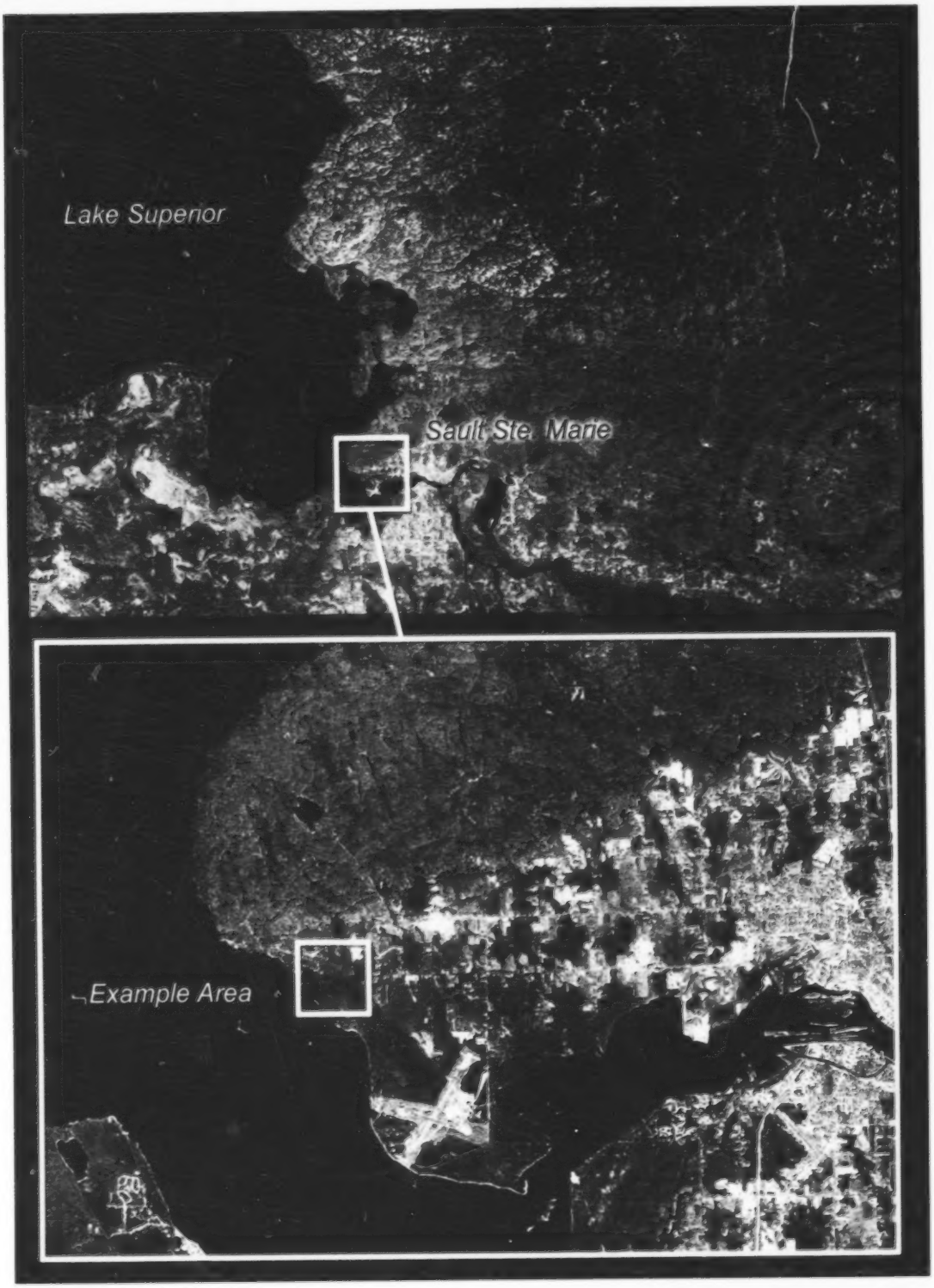
It is important to note as well that many of the pieces used to compile this report originated from varying scales, accuracies, vintages and sources. All attempts have been made to ensure that the data layers line up correctly with minimal errors or overlap. As well, class or data definitions between data sources can vary by source, and not all data elements line up exactly. Examples of the differences between satellite and digital FRI and other data types are highlighted in this chapter.

8.6 – Data Sources Example Area

Section 8.6 shows an example forest area just outside of Sault Ste. Marie, Ontario. The example area is illustrated on the next seven pages, detailing aerial photos and digital inventory products derived as part of the forest resources inventory process, satellite imagery, and base features maps.

8.6 - Example Area

The two Landsat 7 satellite images below show the first example area just outside of Sault Ste. Marie, Ontario. The highlighted example area (approximately 250 ha) is illustrated on the next few pages, detailing aerial photos and digital inventory products derived as part of the forest resources inventory process, satellite imagery, and base features maps.



8.6 - Example Area - Field Work

Creating an Inventory Map - Field Work

The first portion of any forest resources inventory after aerial photos have been aquired is field work. Interpreters check a number of forest plots to validate their photo interpretation work.

Field checks include collecting data on tree heights (laser hipsometer at right), tree species, ages and other related site information. This data is then used to complete the first phase of an inventory.

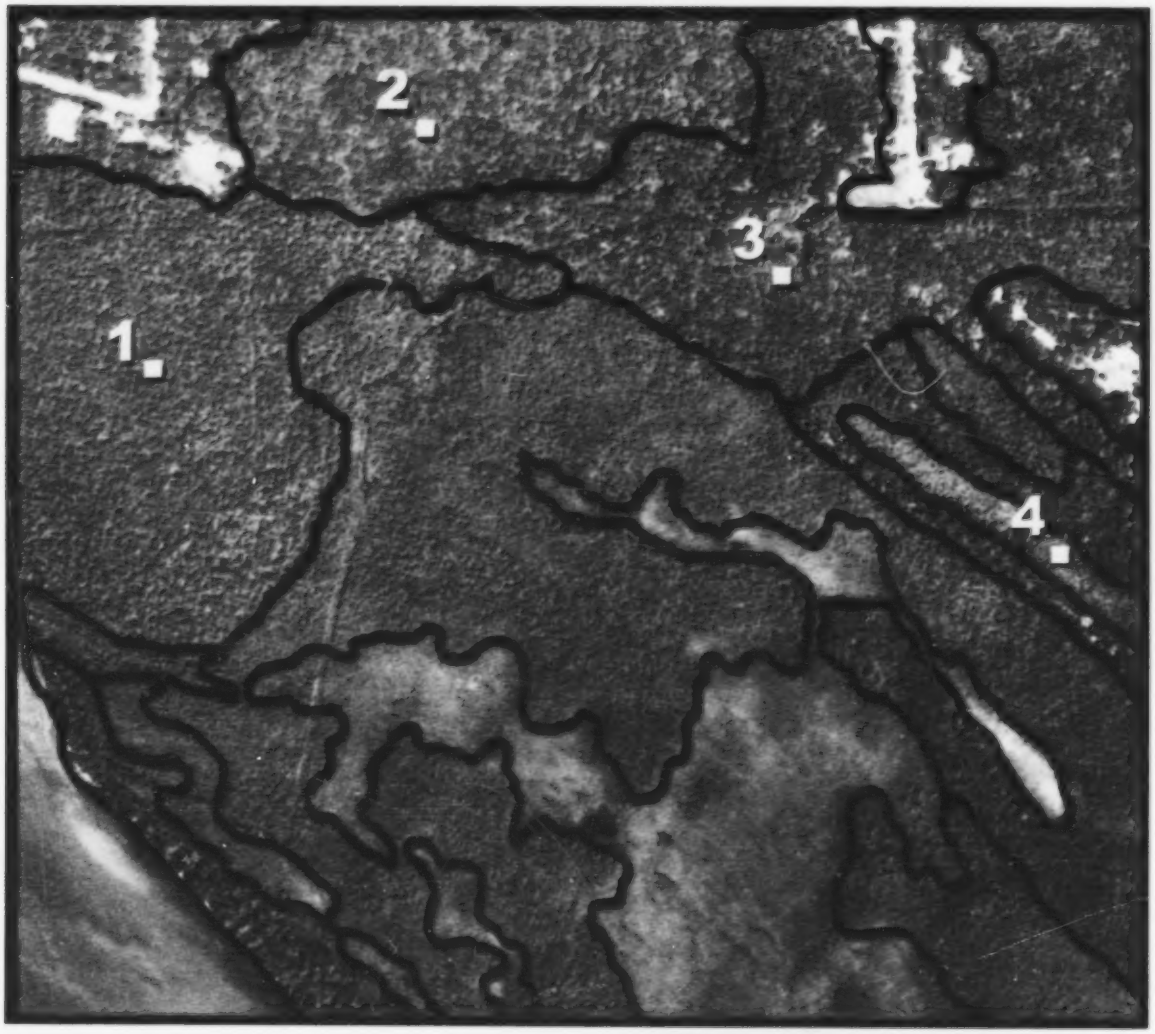
Measuring Tree Age

Tree ages are measured using an increment borer, which extracts a small sample of wood from the bark through to the centre of the trunk. After extraction, tree rings can be counted the same as they would on a stump or log.

8.6 - Example Area - Aerial Photography

Creating an Inventory Map - Aerial Photography and Interpretation

The aerial photograph below is approximately 250 hectares in size. The 3 highlighted squares are example stands with detailed stand summaries and photo examples provided on the following three pages. Taken in 1995, this photograph became part of the Algoma Forest's inventory in 1996. The conversion from this raw photo with initial stand boundaries marked to a digital FRI inventory is displayed on the next page.



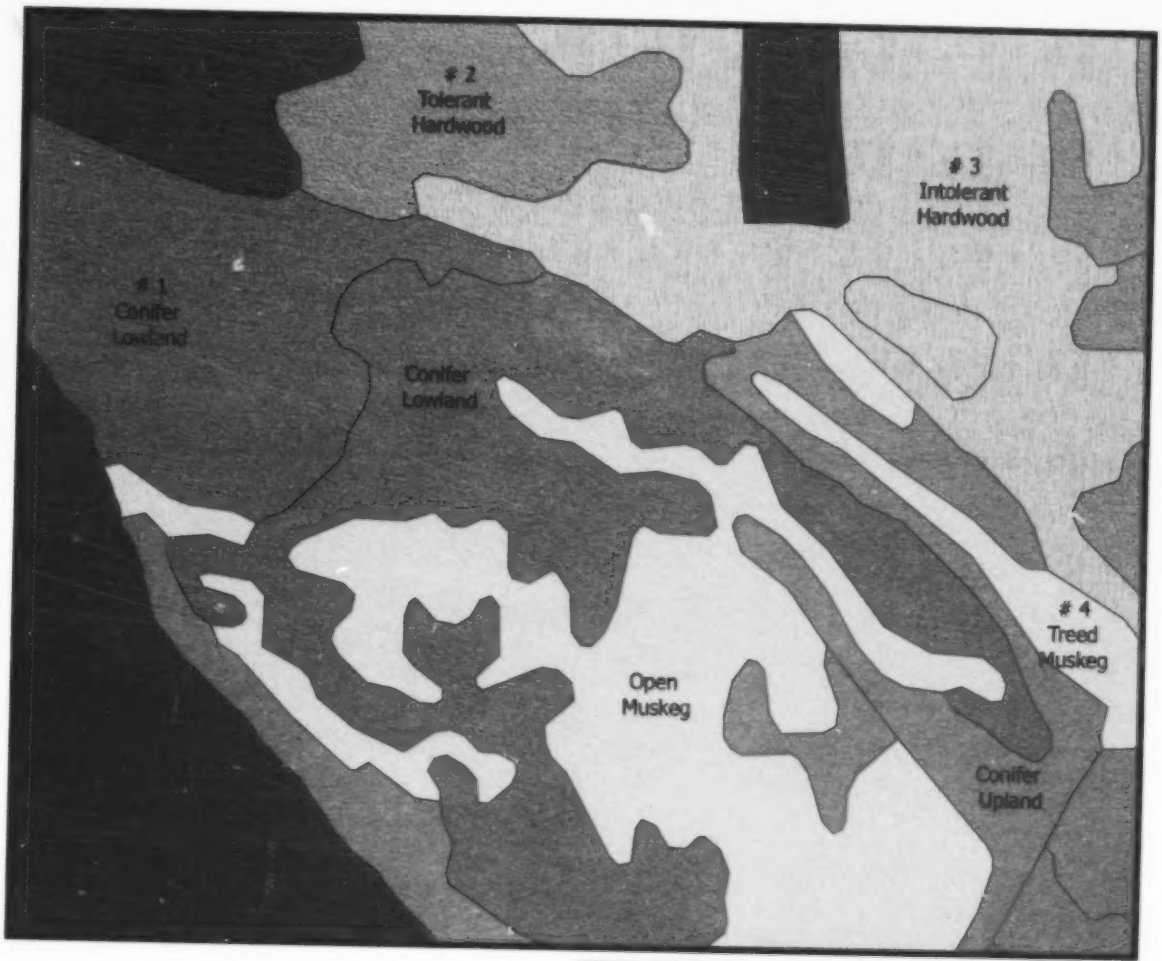
Above: Aerial photo taken in 1995 over example area (scale is approximately 1.7 km wide x 1.5 km high). The black lines drawn around the different forest and land classes denote where stand boundaries were interpreted and will be digitized.

At right: Photo interpreter in the Natural Resources Inventory Section using a stereoscope to view aerial photos.

8.6 - Example Area - Forest Resources Inventory

Creating an Inventory Map - Digital Inventory

This portion of a digital inventory map shows some of the information recorded during the photo interpretation process. Features include area, land type (forest or bog or water), working group (dominant tree species), stand age, site class (productivity), and tree species composition. A full listing of these attributes is shown with the example stands on following pages.



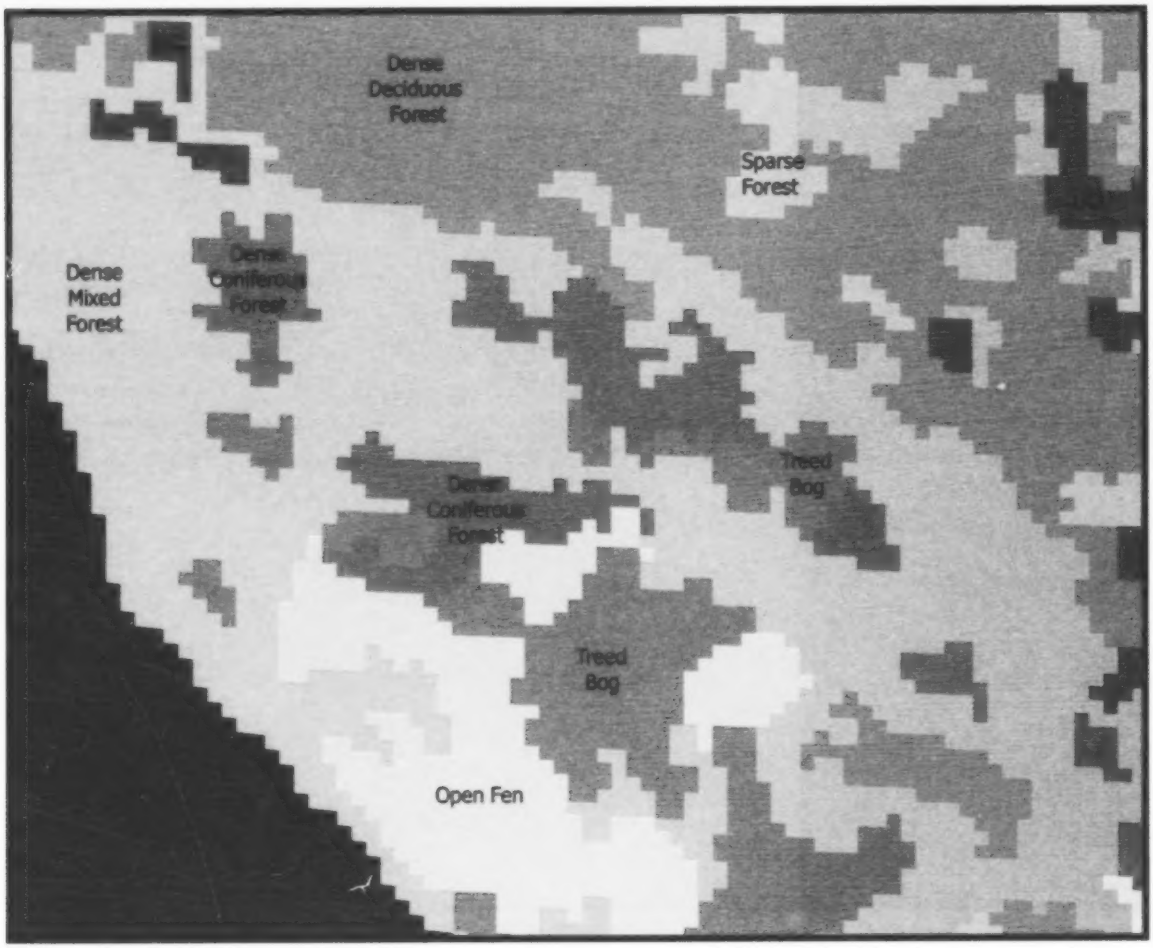
Above: Portion of the digital FRI for the sample area, digitized in 1996 as part of the Algoma Forest.

Right: Digitizing and map work is an important part of the mapping process. Each inventory map goes through several steps and many hands before being used in the field. Even after completion, maps are updated as forest conditions change due to fire, harvest, insect damage, or other disturbances.

8.6 - Example Area - Satellite Imagery

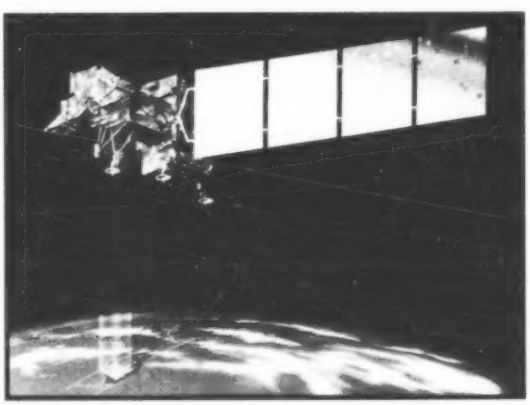
Mapping from Space - Satellite (Landsat) Imagery

The map below is a portion of the Landsat7 satellite imagery used in this report to document Ontario's complete landbase. The individual pixels visible on this map are 25 by 25 metres, and each pixel has a single value from a list of 28 possible values (see introduction to Chapter 2). The differences in this mapping system are apparent when compared to the digital FRI on the previous page. Although the forest types are more generalized, the very small areas of different forest types are highlighted within each FRI stand, resulting in a finer resolution by area.



Above: Portion of the satellite imagery used in this report, and the land classes (by colour) in the example area

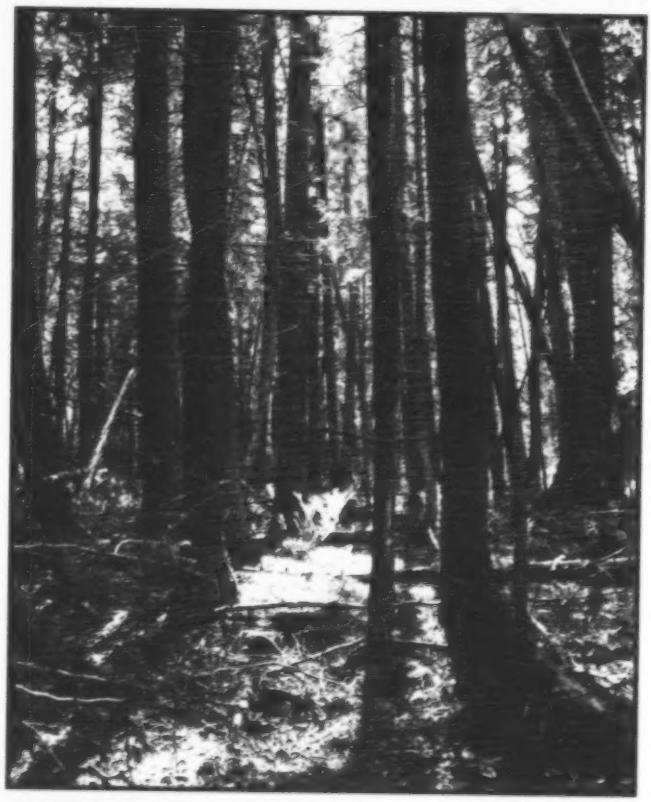
Right: Landsat 7 satellite image, courtesy of NASA. For more information on satellite imagery and satellites on the internet - http://landsat7.usgs.gov/index.php



8.6 - Example Area - Stand Level View

Example Stand #1

This Conifer Lowland site is a black spruce hemlock and cedar stand. The site has moist to wet soils with varying amounts of sphagnum moss and hardwood shrubs in sunny openings. Small amounts of white and yellow birch also occur.



FRI Description

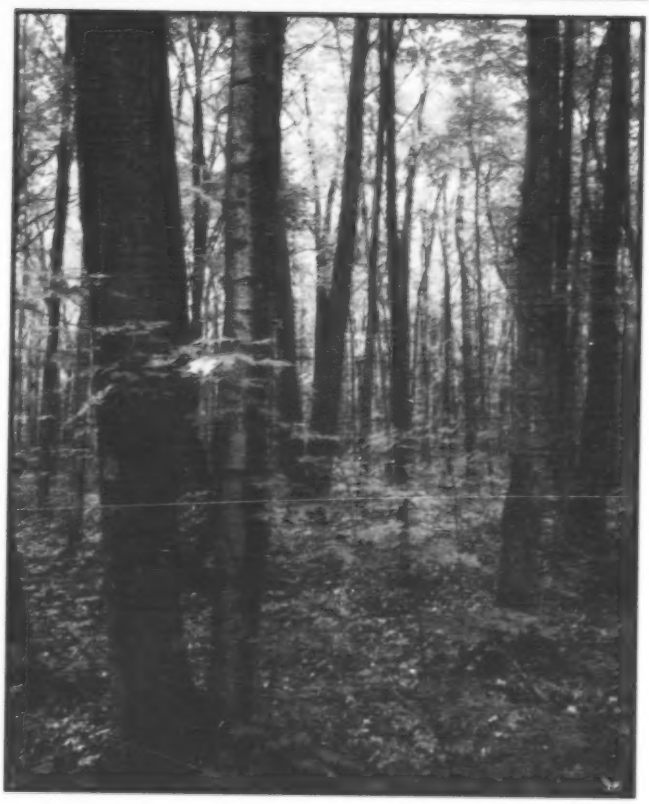
Provincial Forest Type:	Conifer Lowland
Age:	85 yrs.
Seral Stage:	Mature
Composition:	Black Spruce 40%, Hemlock 30%, Cedar 30%
Ecosite:	ES33 - White Cedar - Other Conifers
Stocking:	80%
Height:	12 m
Site Class:	2
Area:	37.1 ha

Satellite Description

Satellite Classes:	Dense Mixed Forest (77%) Dense Coniferous Forest (11%)

Example Stand #2

This Tolerant Hardwood stand is dominated by maple and oak. The site has dry fine sand soil with a hazelnut, honeysuckle and ground hemlock shrub layer.



FRI Description

Provincial Forest Type:	Tolerant Hardwood
Age:	79 yrs. (Uneven Age)
Seral Stage:	Mature
Composition:	Hard Maple 50%, Red Oak 40% Yellow Birch 10%
Ecosite:	ES29 - Sugar Maple-Yellow Birch
Stocking:	100%
Height:	19 m
Site Class:	1
Area:	22.4 ha

Satellite Description

Satellite Classes:	Dense Deciduous Forest (100%)

8.6 - Example Area - Stand Level View

Example Stand #3

This Intolerant Hardwood stand is made up of a mix of poplar, birch and other hardwoods. The site has fresh sandy soil with a hazelnut and balsam fir understory.

FRI Description

Provincial Forest Type:	Intolerant Hardwood
Age:	65 yrs.
Seral Stage:	Mature
Composition:	White Birch 40%, Poplar 30% Hard Maple 10%, Balsam Fir 10% White Spruce 10%
Ecosite:	ES18 - Poplar-Birch Spruce-Fir
Stocking:	60%
Height:	14 m
Site Class:	3
Area:	88.0 ha

Satellite Description

Satellite Classes:	Dense Deciduous Forest (74%) Dense Mixed Forest (16%)

Example Stand #4

This site is a black spruce bog, also called a treed bog or muskeg. The site has deep organic soil (peat or sphagnum moss) with very stunted black spruce and larch with an understory of labrador tea, cotton flower and mosses.

FRI Description

Provincial Forest Type:	Non-Productive Forest
Age:	n/a
Seral Stage:	n/a
Composition:	Black Spruce 70%, Larch 30%
Ecosite:	ES31 - Black Spruce-Larch
Stocking:	n/a
Height:	3 - 6 m
Site Class:	n/a
Area:	7.5 ha

Satellite Description

Satellite Classes:	Treed Bog (75%) Dense Coniferous Forest (15%) Dense Mixed Forest (10%)

8.7 - Volume and Increment Calculations

Normal Yield Table - Black Spruce Site Class 2

5 Year Age Class	Height	Gross Total Volume	Net Merch. Volume	Current Annual Increment	Mean Annual Increment	Basal Area	Number of Trees
	m	*m3*	*m3*	*m3/yr*	*m3/yr*	*m2*	*No./ha*
5	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
20	2.4	15	-	-	2.1	6.4	11,532
25	3.4	26	-	2.2	2.6	10.0	10,037
30	4.4	40	-	2.8	3.0	13.3	8,589
35	5.5	55	-	3.0	3.4	16.2	7,351
40	6.5	71	-	3.2	3.7	18.7	6,427
45	7.4	88	-	3.4	3.9	21.0	5,616
50	8.2	105	-	3.4	4.1	23.1	5,031
55	9.0	121	-	3.2	4.2	25.0	4,599
60	9.7	137	21	3.2	4.2	26.8	4,308
65	10.4	153	36	3.2	4.3	28.2	3,896
70	11.0	167	53	2.8	4.2	29.7	3,706
75	11.6	181	71	2.8	4.2	31.0	3,578
80	12.2	194	88	2.6	4.2	32.2	3,405
85	12.6	206	104	2.4	4.1	33.3	3,254
90	13.1	217	119	2.2	4.0	34.2	3,099
95	13.5	227	134	2.0	4.0	35.0	2,983
100	13.9	237	146	2.0	3.9	35.7	2,866
105	14.2	245	158	1.6	3.8	36.3	2,753
110	14.5	252	169	1.4	3.8	36.8	2,649
115	14.8	259	179	1.4	3.7	37.2	2,550
120	15.0	264	187	1.0	3.6	37.5	2,454
125	15.3	268	194	0.8	3.5	37.7	2,367
130	15.5	271	196	0.6	3.4	37.8	2,286
135	15.7	274	199	0.6	3.4	37.9	2,219
140	15.8	276	200	0.4	3.3	37.9	2,162
145	16.0	277	201	0.2	3.2	38.0	2,113
150	16.1	278	201	0.2	3.1	38.0	2,073

Normal Yield Table (Metric) for Major Forest Species in Ontario - Plonski (1981)

Gross Total Volume - Black Spruce Calculating Volume

For each stand in the FRI, an age height-relationship determines relative productivity, both in terms of volume and growth rate. As well, stand density (stocking) is also calculated using aerial photo interpretation.

The example stand listed below is a black spruce stand which demonstrates how gross total volume is calculated, using the site class 2 tables listed above.

All volumes in this publication were calculated in this way.

Example Stand Attributes:

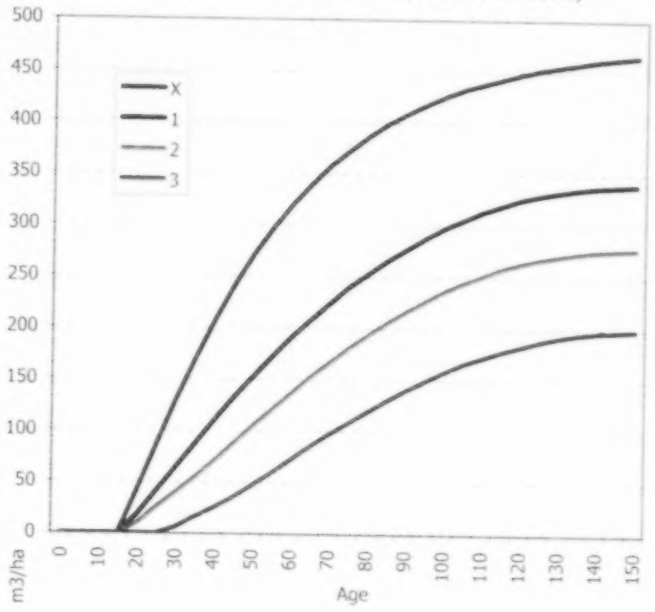
Working Group	Black Spruce
Site Class	2
Stocking	80%
Area (ha)	26
Age (yrs.)	39
Height (m)	6.5
Species	Sb 100%
Mapsheet #	176405190
Stand #	3456

Volume and Increment Calculations

Gross Total Volume x stocking = GTV (m3)
71 m3 x 80% = 56.8 m3/ha
Volume per hectare x Total area = Total Stand Volume
56.8 m3/ha x 26 ha = 1,476.8 m3

Total Current Annual Increment x stocking = CAI / ha
3.2 m3/ha/yr x 80% = 2.56 m3/ha/yr
Current Annual Increment per hectare x Stand Area = CAI
2.56 m3/ha/yr x 26 ha = 66.56 m3/yr

Black Spruce Site Index Curves (Gross Total Volume)



Glossary of Terms

This glossary defines terms that appear in the text or relate to the text of the Forest Resources of Ontario 2006. Sources are identified by abbreviation in parentheses following the term definition. Full sources are listed after the glossary of terms. Where a definition has been listed in the glossary of the Forest Management Planning Manual for Ontario's Crown Forests (FMPM) as regulated under the Crown Forest Sustainability Act, 1994, the original source cited there is omitted.

AC - AGE CLASS
(1) One of the intervals into which the age range of forest stands is divided for classification and use. (FMPM)
(2) A category into which the average age or age range of trees or other vegetation is classified. Age class is usually used in reference to even-aged stands of trees. It represents the dominant age of the main body of trees in a stand. In mixed-age stands, age class can be used to describe the average age of specific cohorts of trees. (CCFM)

AOU - AREA OF THE UNDERTAKING
The area within the geographic boundaries of the area of the undertaking is all land and water within forest management unit boundary lines. The northern boundary is generally the northern limit of current commercial timber operations; the southern boundary is generally the limit of the forest on Crown Land. Crown land within that area is subject to the undertaking. (after FMPM).

BIOLOGICAL DIVERSITY (Biodiversity)
The variety and variability among living organisms from all sources, including terrestrial, marine and aquatic ecosystems, and the ecological complexes of which they a part. (FMPM)

CAMBRIAN SHIELD
Area of granite bedrock formed during the Archean Era (2.5 billion years ago).

CLEARCUT
(1) n. Area harvested under the clearcut silvicultural system. (FMPM) (2) v. The removal of the entire standing crop over a considerable area in one operation, with or without leaving seed trees. (FMPM)

CONIFER
(1) Any of an order (*Coniferales*) of mostly evergreen trees and shrubs including forms (as pines) with true cones and others (as yews) with an arillate fruit. (FMPM) (2) Needle-bearing trees that produce seeds in cones. (FMPM)

CROWN FOREST
A forest ecosystem or part of a forest ecosystem that is on land vested in Her Majesty in right of Ontario and under the management of the Minister of Natural Resources. (CFSA)

CFSA - CROWN FOREST SUSTAINABILITY ACT, 1994
An Act of the Ontario legislature to provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic, and environmental needs of present and future generations. (after CFSA)

CROWN LAND
Land vested in Her Majesty in right of Ontario. (FMPM)

CURRENT ANNUAL INCREMENT
see at Volume

DECIDUOUS
Annual shedding of tree foliage (leaves or needles).
see also Hardwood

DEFOLIATION
An unreasonable reduction in the foliage cover of a plant due to attacks by insects or fungal disease, or as a result of other factors such as drought, storms, or chemicals in the atmosphere. (CCFM)

DEPLETED AREA
Managed forest area on which merchantable volume has been decreased due to harvest, fire, insect, disease, or other causes, and where forest renewal is required. (FMPM)

DEPLETIONS
A decrease in growing stock:
(1) In the FRI recording process, a reduction in the free-to-grow (FTG) area because of reclassification into barren and scattered

due to harvest, burning, flooding, wind damage, or insects and disease. (after TMPM)
(2) In the available harvest area control process, a recording against the currently allocated areas caused by harvest, burning, flooding, wind damage, or insects and disease, allocation to other ownership or uses, land declaration of inoperability (bypass). (after TMPM)
(3) Reductions to the forest due to harvest, fire, insect, disease, or other causes. (FMPM)

DISTURBANCE
A significant change in the structure and/or composition of ecosystems, communities or populations through natural or human-induced events. (CCFM)

EA DECISION
Environmental Assessment Board's Reason for Decision and Decision: Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario (EA-87-02), released April 20, 1994.

ECODISTRICT
An ecological land classification unit. A subunit of an ecoregion, based on distinct assemblages of relief, geology, landform, soils, vegetation, water, and fauna. The subdivision is based on distinct physiographic and/or geological patterns. (after TELC)

ECOELEMENT
An ecological land classification unit. A subdivision of an ecosite displaying uniform soil, topography, vegetation, and hydrology. (after TELC)

ECOLOGICAL LAND CLASSIFICATION (System)
(1) A hierarchical approach to classifying land that is based on a consistent framework of landscape-scale through sitescale ecosystems by combinations of geologic, climatic, vegetative, soil, and landform features. (after FMPM).
(2) An approach that attempts to identify ecologically similar areas. The system has seven hierarchical levels that are currently called, from largest to smallest: ecozone, ecoprovince, ecoregion, ecodistrict, ecosection, ecosite, and ecoelement. (after TELC).

ECOREGION
(1) An ecological land classification unit. An area characterized by a distinctive regional climate as expressed by vegetation. (after TELC)
(2) An ecological landscape unit (ranging in resolution from hundreds of thousands to tens of thousands of square kilometres) characterized by distinct patterns of responses to climate as expressed by soils, hydrology, vegetation (species ranges and productivity), and fauna. (FMPM)

ECOSITE
(1) An ecological land classification unit. A subdivision of an ecosection that consists of an area of land with a particular parent material, having a homogeneous combination of soils and vegetation. (after TELC)
(2) An ecological landscape unit (ranging in resolution from thousands to hundreds of hectares) comprised of relatively uniform geology, parent materials, soils, topography, and hydrology, occupied by a consistent complex of successionally related vegetation conditions. (FMPM)

ECOSYSTEM
The sum of the plants, animals, environmental influences, and their interactions within a particular habitat. (FMPM)

ECOSYSTEM MANAGEMENT
The management of human activities so that ecosystems, their structure, composition, and function, and the processes that shaped them can continue at appropriate temporal and spatial scales. (CBS)

ECOZONE
An ecological land classification unit, and the most general level. An area of the earth's surface representing large and very generalized ecological units characterized by interacting abiotic and biotic factors. (after TELC)

FOREST COVER
All trees as described by the Forest Resources Inventory. (FMPM)

FOREST DYNAMICS
The natural processes involved in the development of a forest and associated with growth and changes to its structure and composition through time. (FMPM)

FOREST ECOSYSTEM
An ecosystem in which trees are, or are capable of, being a major biological component. (CFSA)

FOREST INFORMATION MANUAL
A manual prepared under section 68 of the Crown Forest Sustainability Act and approved by the regulations, including amendments to the manual approved by the regulations. (CFSA)

FOREST INVENTORY
A composite information product which is assembled from a collection of individual geographic information coverages that contain descriptive information about the timber resource on each management unit (e.g., stand age, stand height, species composition, stocking level). The forest resources inventory for a management unit divides the area into a number of components, such as water, non-forested, non-productive forest and productive forest, and further classifies each component by ownership/land use categories. (Adapted FIM).

FOREST MANAGEMENT
Generally, the practical application of scientific, economic and social principles to the administration and working of a forest for specified objectives; more particularly, that branch of forestry concerned with the overall administrative, economic, legal and social aspects, and with the essentially scientific and technical aspects, especially silviculture, protection and forest regulation. (FMPM)

FOREST MANAGEMENT PLANNING MANUAL (FMPM)
A Manual prepared under section 68 of the Crown Forest Sustainability Act and approved by the regulations, including amendments to the Manual approved by the regulations. (CFSA)

FOREST TYPE
A group of forested areas or stands of similar composition; forest types are usually separated and identified by species composition and often by height and crown closure classes. (FMPM)

FOREST UNIT
An aggregation of forest stands for management purposes which have similar species composition, develop in a similar manner (both naturally and in response to silvicultural treatments), and are managed under the same silvicultural system. (FMPM)

FRAGMENTATION
The breaking up of the forest into isolated patches through agriculture and urban development.

FREE-TO-GROW
Stands that meet stocking, height, and/or height growth rate, as specified in the ground rules and are judged to be essentially free from competing vegetation. (after FMM)

GEOGRAPHIC INFORMATION SYSTEM
An information system that uses a spatial database to provide answers to queries of a geographical nature through a variety of manipulations, such as sorting, selective retrieval, calculation, spatial analysis, and modelling. (FMPM)
see also Spatial or Spatial Database

GROSS MERCHANTABLE VOLUME
see at Volume

GROSS TOTAL VOLUME
see at Volume

GROWING STOCK
All the trees growing in a forest or in a specified part of it, generally expressed in terms of number or volume. (STC)

HARDWOOD
The wood of an angiospermous tree as distinguished from that of a coniferous tree. (FMPM)

HARVEST METHOD
An adjective used to further define or modify one of the three basic silvicultural systems, specifically the harvesting component/technique (e.g., strip clearcut, group shelterwood). (FMPM)

INVENTORY
see Forest Inventory

LANDSCAPE
A heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout. (FMPM)
see also Ecological Land Classification

MANAGED FOREST
Crown forest for which there is no legal or land use planning decision which prevents the land from being managed for timber production. (FMPM)

MANAGEMENT UNIT
All or part of a Crown forest that has been designated as a management unit for the purposes of the Crown Forest Sustainability Act. (FMPM)

MATURE
In even-aged management, those trees or stands that are sufficiently developed to be harvestable and that are at or near rotation age (includes overmature trees and stands for which an overmature class has not been recognized). (STC)

MEAN ANNUAL INCREMENT
see at Volume

MERCHANTABLE TIMBER (MERCHANTABLE TREE)
(1) A (standing) conifer, poplar, or white birch log (tree) of which more than one-half of the total content is sound wood. (after FMPM)
(2) A (standing) hardwood log (tree) other than poplar or white birch of which more than one-third of the total content is sound wood when the content is measured in cubic metres. (after FMPM)

MIXEDWOOD(S)
A forest type in which 26-75% of the canopy is softwood. (FMPM)

NATURAL REGENERATION
see at Regeneration

NET MERCHANTABLE VOLUME
see at Volume

NON-PRODUCTIVE FOREST LAND
In the Forest Resources Inventory, it is that part of the forest ecosystem consisting of treed muskeg, open muskeg, rock, and brush and alder. (FMPM)

NON-SPATIAL
(1) Information stored in a form or format that is not directly usable by geographic information systems (e.g., hard-copy maps or tabular datasets). (FIM)
(2) Records of physical attribute information that do not have a parameter/variable(s) for geographic location in a recognized standardized map coordinates system, and compatible with vector or raster geographic information systems.
see also Geographic Information System
see also Spatial or Spatial Database

OLD GROWTH
A stand of mature or overmature trees relatively uninfluenced by human activity. (FMPM)

OLD GROWTH FORESTS
(1) Old growth forests are well past the age of maximum growth, frequently showing great horizontal and vertical density of structure and plant species composition, and possessing one or more features not seen in much younger forests such as snags, downed woody material, or arboreal lichens. (FMPM)
(2) Ecosystems characterized by the presence of old trees with their associated plants, animals, and ecological processes. They show little or no evidence of human disturbance. (FMPM)

ORGANIC SOIL
Soil containing a high proportion (greater than 20 or 30 percent) of organic matter. (GOFT)

OVERMATURE
In even-aged management, those trees or stands past the mature stage. (FMPM)

PATENT LAND (PRIVATE)
Land transferred from Her Majesty the Queen in the Right of Ontario to an individual, company or corporation in perpetuity. (FMPM)

PHOTO INTERPRETATION
The detection, identification, description, and assessment of significance of objects and patterns imaged on a photograph. (FITC)

PLANNING AREA
This area was defined during the Ontario's Living Legacy process encompassing the Area of the Undertaking and includes the addition of five large parks bordering this area.

PRODUCTIVITY
A change in biomass (volume) per unit area and time (yield, increment). (FMPM)

PRODUCTION FOREST
Productive forest land, at various stages of growth, with no obvious physical limitations on the ability to practice forest management. (FMPM)

PRODUCTIVE FOREST LAND
All forest areas which are capable of growing commercial trees, irrespective of planning decisions, and which is further sub-divided into "protection forest" and "production forest". (FMPM)

PROTECTED AREAS
Areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage. (GOFT)

PROTECTION
Forest management operations which are carried out to prevent, control, or manage the spread of, and/or the damage caused by, insects and diseases. Protection may involve the use of insecticides or manual treatments. (FMPM)

PROTECTION FOREST
Productive forest land on which forest management activities cannot normally be practiced without incurring deleterious environmental effects because of obvious physical limitations such as steep slopes and shallow soils over bedrock. (FMPM)

QUATERNARY
A division of time that covers the last two million years through to today.

REMOTE SENSING
Any data or information acquisition technique that uses airborne techniques and/or equipment to determine the characteristics of an area. (GOFT)

SERAL STAGE
(1) One of the intervals into which the age range of forest stands is divided for classification and use, based on the development stages of ecological succession. (modified FMPM)

SILVICULTURAL SYSTEM
A process, following accepted silvicultural principles, whereby crops constituting a forest are tended, harvested, and regenerated, resulting in the production of crops of distinctive form. Systems are conveniently classified according to the method of harvesting the mature stands with a view to regeneration and according to the type of crop produced thereby:
(1) Clearcut System: A silvicultural system of regenerating an even-aged forest stand in which new seedlings become established in fully exposed micro-environments after most or all of the existing trees have been removed. Regeneration can originate naturally or artificially. Clearcutting may be done in blocks, strips, or patches. (FMPM)
(2) Seed-Tree: A method of harvesting and regenerating a forest stand in which all trees are removed from the area except for a small number of seed-bearing trees that are left singly or in small groups. The objective is to create an even-aged stand. (FMPM)
(3) Shelterwood System: An even-aged silvicultural system, where mature trees are harvested in a series of two or more cuts (preparatory, seed, first removal, final removal) for the purpose of obtaining natural regeneration under shelter of the residual trees, whether by cutting uniformly over the entire stand area, or in narrow strips, or groups. Regeneration is natural (the seeding cut) or artificial. Regeneration interval determines the degree of even-aged uniformity. (after FMPM)
(4) Selection System: An uneven-aged silvicultural system where mature and/or undesirable trees are removed individually or in small groups over the whole area, usually in the course of a cutting cycle. Regeneration is generally natural. (FMPM)

SILVICULTURE
Generally, the science and art of cultivating forest crops, based on a knowledge of silvics. More particularly, the theory and practice of controlling the establishment composition, constitution, and growth of forests. (FMPM)

SITE
An area considered in terms of environment, particularly as this determines the type and quality of the vegetation the area can carry. (FMPM)

SITE CLASS
Any interval into which the site index range is divided for purposes of classification and use. (STC)

SITE DISTRICT
see syn. Ecodistrict

SITE INDEX
An expression of forest site quality based on the height, at a specified age, of dominant and codominant trees in a stand. May be grouped into site classes. Expressed in metres. Usually refers to a particular species. (FITC)

SITE REGION
see syn. Ecoregion

SITE TYPE
see Ecosite

SOFTWOOD(S)
Cone-bearing trees with needles or scalelike leaves belonging to the botanical group Gymnospermae. Also, stands of such trees and the wood produced by them. (FMPM)

SPATIAL or SPATIAL DATABASE
A collection of interrelated geographically referenced data stored without unnecessary redundancy to serve multiple applications as part of a geographic information system. (FITC)
see also Geographic Information System
see also Geographically Referenced
see also Non-spatial (aspatial)

SPECIES
A singular or plural term for a population or series of populations of organisms that are capable of interbreeding freely with each other but not with members of other species. (FMPM)

STAND
A community of trees possessing sufficient uniformity in composition, constitution, age, arrangement, or condition to be distinguishable from adjacent communities. (FMPM)

STOCKING
An expression of the adequacy of tree cover on an area, in terms of crown closure, percentage of stocked quadrats, number of trees, basal area, or volume, in relation to pre-established managerial norm. (FMPM)

SUCCESSION
Changes in species composition in an ecosystem over time, often in a predictable order. (FMPM)

UNMERCHANTABLE
A tree or stand that has not attained sufficient size, quality, and/or volume to make it suitable for harvesting. (STC)

VOLUME
(1) The amount of wood in a tree, stand, or other specified area, according to some unit of measurement or some standard of use. (FMPM)
(2) Gross merchantable volume: Volume of the main stem, excluding stump and top but including defective and decayed wood, of trees or stands. (FMPM)
(3) Gross total volume: Volume of the main stem, including stump and top as well as defective and decayed wood, of trees or stands. (FMPM)
(4) Net merchantable volume: Volume of the main stem, excluding stump and top as well as defective and decayed wood, of trees or stands. (FMPM)
(5) Mean Annual Increment: Average annual timber volume growth per unit area, for example, in cubic feet per year. Assuming even-aged management with clearcutting. (after FREF)

WETLAND
Land that is seasonally or permanently covered by shallow water, as well as land where the water table is close to or at the surface. In either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water-tolerant plants. The four major types of wetlands are swamps, marshes, bogs, and fens. (FMPM)

WORKING GROUP
An aggregate of stands, including potential forest areas assigned to this category, having the same predominant species, and managed under the same broad silvicultural system. (FMPM)

YIELD
The actual or estimated harvest of forest products over a given period of time. (FMPM)

Glossary of Terms Sources

CBS Environment Canada. 1994. Canadian Biodiversity Strategy, Working Document For Internal Discussion.
Prepared by the Federal-Provincial-Territorial Biodiversity Working Group (September 30,1994).

CCFM Canadian Council of Forest Ministers. 2000. Criteria and Indicators of Sustainable Forest Management in Canada, National Status 2000. Ottawa, ON.

CFSA Statutes of Ontario. 1995. Crown Forest Sustainability Act, 1994. Queens Printer for Ontario. Toronto, ON.

EA Ontario Environmental Assessment Board. April 1994. Reasons for Decision and Decision. Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario. Ontario Environmental Assessment Board, Toronto, ON. Rep. No. EA-87-02.

FIM OMNR. Forest Information Manual, 2001. Ont. Min. Nat. Resour., Toronto. ON.

FITC Forestry Canada. 1988. Forest Inventory Terms in Canada. Canadian Forest Inventory Committee, Forestry Canada, Ottawa, ON.

FMM OMNR. 1980. Forest Management Manual for the Province of Ontario. Ont. Min. Nat. Resour., Toronto, ON.

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